

# AMERICAN ARTISAN

**MARCH  
1942**



RESIDENTIAL AIR CONDITIONING

★ WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED  
1888



**L A M N E C K**

**PREFABRICATED DUCT  
AND FITTINGS**

**SIMPLIFIED FURNACE  
PIPE AND FITTINGS**

**FOR ALL TYPES  
OF RESIDENTIAL  
GRAVITY AND FORCED  
WARM AIR HEATING  
AND AIR CONDITIONING  
SYSTEMS**

**LAMNECK PRODUCTS, INC.**

*Middletown, Ohio*



# Here's Your PRODUCTION AID

The RYERSON  
1942 STOCK LIST



## RYERSON STEELS



JOSEPH T. RYERSON & SON, INC.

1942-43

Beams	7
Channels	11
Angles	11
Plates	23
W. Steel	35
R. Bars & Strip	37
Old. Fin. Bars	59
Alloys	81
Heat Treat. Alloys	111
Tool Steel	117
Sheets	133
Spec. Sheets	147
Stainless	159
Tubing	177
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Welding Rod	205
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Castings	235
Castings	241

Ryerson again assembles complete and helpful listings of more than 10,000 steel sizes and shapes...puts comprehensive information at your fingertips...helps you order steel. This new 1942 Ryerson Stock List is engineered for convenience—quick—new tab-indexed, handy pocket size, crammed full of facts that will make it a steel buyer's "book of knowledge."

Even though many kinds of steel cannot always be delivered promptly, because of war demands, you can depend on Ryerson to help you; to work with you on your steel problems; to give you the best service possible in keeping with government regulations.

Make this 100th Anniversary Ryerson Stock List your guide—use it. If you have not received your copy, write your nearest Ryerson plant. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Philadelphia, Boston, Jersey City.

**RYERSON** *Certified* **STEELS**



# AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

WITH WHICH ARE MERGED

FURNACES  
AND  
SHEET METALS

AND

Warm-Air  
Heating

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 111, No. 3

March, 1942

Founded 1880

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## In This Issue

TWO important orders from Washington are reported in this issue. The first—the New Defense Housing Materials Critical List—page 32, is a far reaching piece of regulation which will affect in varying degrees every installer in the country.

The Critical Materials List is not a code—we have tried to emphasize this with the article—but the list does constitute a code *indirectly* because it tells us what materials we can and cannot use and how we must use them. How to meet these restrictions will call for drastic changes in our installation practices.

And the Critical Materials List also acts as a code because it places a ceiling on house size and heat loss and tells us how the furnaces installed shall be rated to meet governmental regulations. We have tried to help quick reading by placing a pointing finger opposite each section which you must read.

The second important order is the much heralded gas furnace limiting order—page 34. Many rumors were handed out about this order—in most ways the actual order is all the things rumored. Until exceptions are made in the blanket order, it is all-inclusive. See page 31 for some sidelights on this gas order.

We believe that this year readers will be interested in convention reports—even from states they know only in geography. The reason—convention committees have made special efforts to present the facts on all the regulations on business and the speakers, for the most part, have known their stuff. We have tried to report these addresses as accurately as possible.

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**More than 8,000 copies of this issue are being distributed**

# SAL-MO ASBESTOS PRODUCTS



## SAL-MO ASBESTOS DUCTBOARD No. 77

**A** MODERN material, made of Asbestos and developed especially for use in constructing cold air return ducts in warm air heating plants.

**USE IT INSTEAD OF METAL**—Sal-Mo Ductboard No. 77 conserves metal for work where metal only can be used. It cannot rust out, a feature superior to sheet metals.

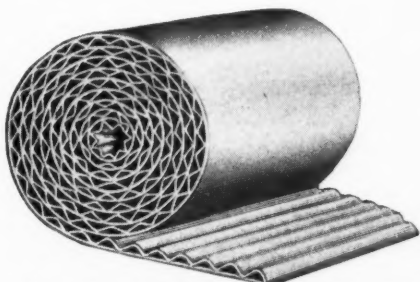
**FIREPROOF** — Made of Asbestos throughout it is fireproof and can be used safely near electrical wiring without danger of short circuit and fire.

**MOISTURE RESISTANT**—Treated on both sides and on all four edges. It can be used for all duct lining.

**EASILY AND QUICKLY APPLIED**—Sheet size is 33" x 48", 1/8" thick, exactly right for covering 3 joists spaced at 16" centers, making 2 return ducts. Cut it with saw, knife, or snips and apply with hammer and wallboard nails or with stapler.

**ATTRACTIVE IN APPEARANCE**—Smooth and light gray in color. Easy to keep clean. May be painted or plastered.

It is acceptable on cold air returns where galvanized sheet metal was formerly required. It is being extensively used in many FHA Housing projects.



**SAL-MO ASBESTOS CORRUGATED PAPERS**



**SAL-MO ASBESTOS SHEET MILLBOARD**

**OTHER** Asbestos Products manufactured by Sall Mountain Company have earned an enviable reputation with Warm Air Heating Contractors and installers and leading Jobbers.

Expert workmanship and the finest materials go into Sal-Mo Asbestos Products.

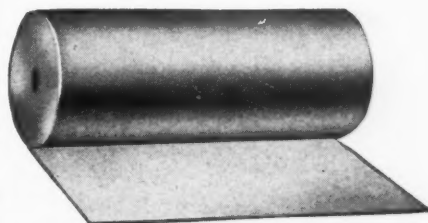
**SAL-MO ASBESTOS PAPER AND ROLLBOARD**—Made of the finest grades of asbestos fibre produced in our own mines, making a smooth, strong, white sheet.

**SAL-MO ASBESTOS CORRUGATED PAPERS**—Fireproof, for insulating hot air pipes, ovens, furnaces, etc.

**SAL-MO ASBESTOS SHEET MILLBOARD**—A strong board for insulating stoves, ovens, electrical wiring and heating appliances, and for protecting ceilings and walls.

**SAL-MO ASBESTOS PIPE-JOINT TAPE**—For covering both hot and cold air pipe joints and for sealing cracks. Easily and quickly applied.

**SAL-MO ASBESTOS BLACKOUT BOARD**—Fireproof and water repellent; easy to use and economical. It prevents damage from flying glass in event of bombings and other explosions. Investigate this new product.



**SAL-MO ASBESTOS PAPER AND ROLLBOARD**



**SAL-MO ASBESTOS PIPE-JOINT TAPE**

**SALL MOUNTAIN COMPANY**  
176 West Adams Street Chicago, Illinois

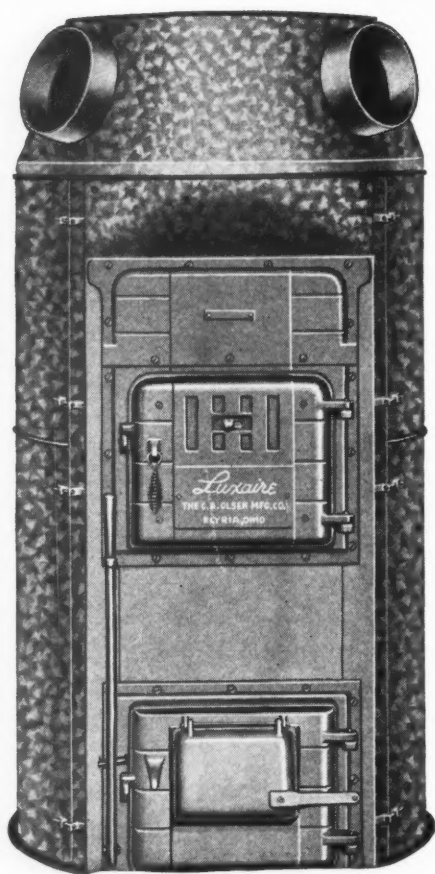


# ANNOUNCING THE NEW

# *Luxaire*

# Defense Housing

# GRAVITY FURNACE



SERIES No. 720-SAG

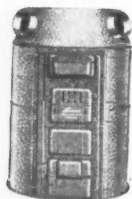
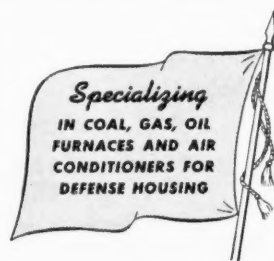


Again . . . Luxaire scores with this NEW . . . ALL STEEL . . . LOW COST . . . Gravity Furnace designed to meet the heating demands in the gigantic defense housing program.

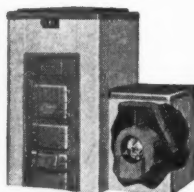
Heating element is of all-steel welded construction, 20" dia. Grates are of the rocking, dumping type. Has 376 inches Standard Code rating for the one-floor defense houses that predominate in the 1942 building market.

If you are interested in the Defense Housing field it is easier to sell this new furnace than to compete against it. Obtain prices before you submit any more quotations.

*Luxaire's contribution to National Defense includes forced air furnaces now heating buildings in a high percentage of army camps and cantonments.*



SERIES 600  
Coal Burning Hand  
Fired Gravity Furnace.  
A leader in its field.



SERIES AC 700  
Coal Burning Hand Fired  
Air Conditioning Unit.  
Stoker models available.



SERIES 8000  
Oil Burning Air Condi-  
tioning Unit. Compact—  
Efficient.



SERIES 718-SA  
Coal Burning Hand Fired  
Air Conditioning Unit.  
For Defense Homes.



SERIES 718-SH  
Coal Burning Hand Fired  
Air Conditioning Unit.  
Hiboy Model.

**THE C. A. OLSEN MANUFACTURING COMPANY, ELYRIA, O.**

**For  
Dependable  
Power**

**On War Industries'  
Air Conditioning Installations  
Look to CENTURY MOTORS**

**They provide these advantages:**

1. High starting torque necessary to handle modern compressors under unusual conditions.
2. Quiet starting, quiet acceleration, and quiet running at all times.
3. Unusual freedom from electrical and mechanical vibration.
4. Century's unique bearing bumpers reduce chatter from V-belt irregularities.
5. Cushion base mountings isolate possible vibration from your installation (3 horsepower and smaller).

Selection of the proper Century Motor is an easy matter because of Century's extremely wide range of types and sizes, from fractional to 400 horsepower—all effective in solving the many problems of industrial air conditioning motor drives.

For complete information, call in your nearest Century Motor Specialist—his help may be valuable and he is always at your service.

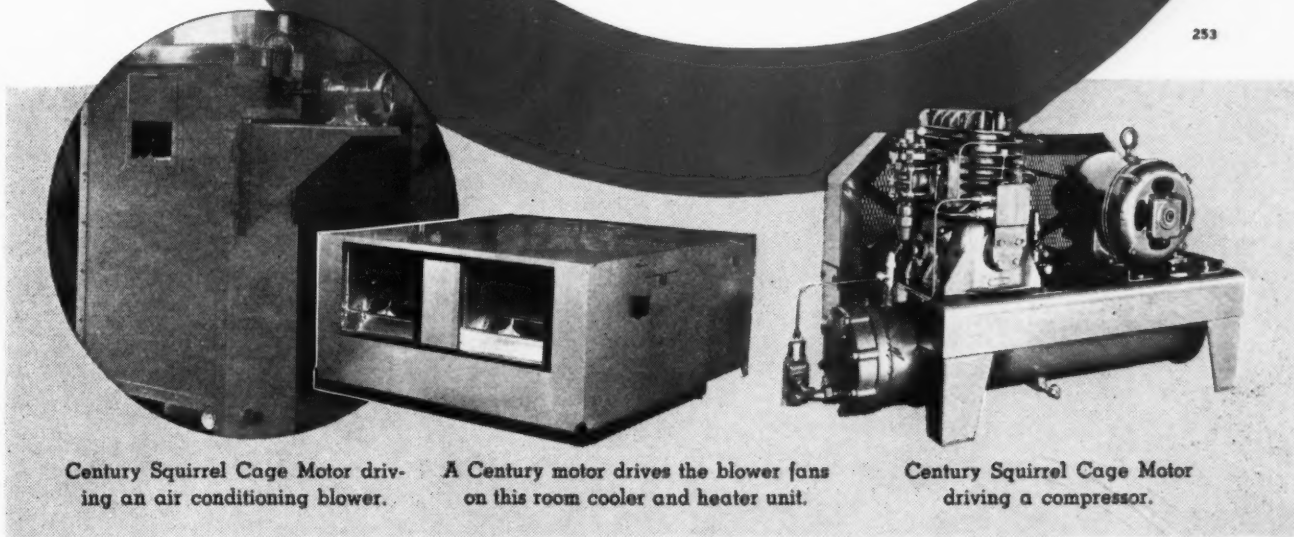
**CENTURY ELECTRIC COMPANY**



1806 Pine Street St. Louis, Missouri  
Offices and Stock Points in Principal Cities

One of the Largest Exclusive Motor and Generator  
Manufacturers in the World

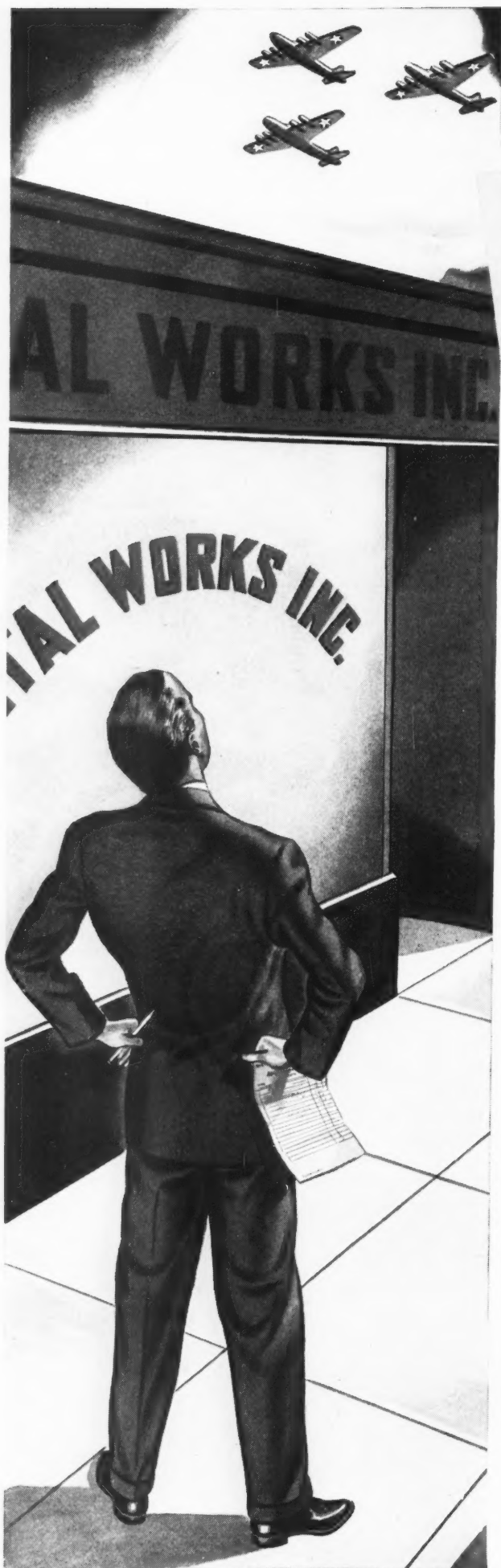
253



Century Squirrel Cage Motor driving an air conditioning blower.

A Century motor drives the blower fans on this room cooler and heater unit.

Century Squirrel Cage Motor driving a compressor.



**Yours is a great  
contribution to our  
war effort...**

Our war effort needs practically all of the copper that would otherwise go into the familiar materials of your trade... flashing, roofing, gutters, etc. Here's where copper is now being used...

About one-third of all copper is needed for ammunition—cartridge cases, rotating bands on shells, time fuses, etc.

Wire and cable for vital electrical conductors in the war industries... in tanks and bombers and battleships... also require a tremendous quantity.

And still more copper is needed for a variety of other uses... in naval and merchant ships of all types... in oil refineries, munitions plants and other places where copper serves best.

So, in doing temporarily without these Anaconda products, you can see how you are helping to make America's war effort strong and forbidding. *And the stronger it becomes, the sooner these materials will once again be available to you.* Our vast production facilities are helping to make your sacrifice as short-lived as possible.



**Anaconda Copper**

THE AMERICAN BRASS COMPANY

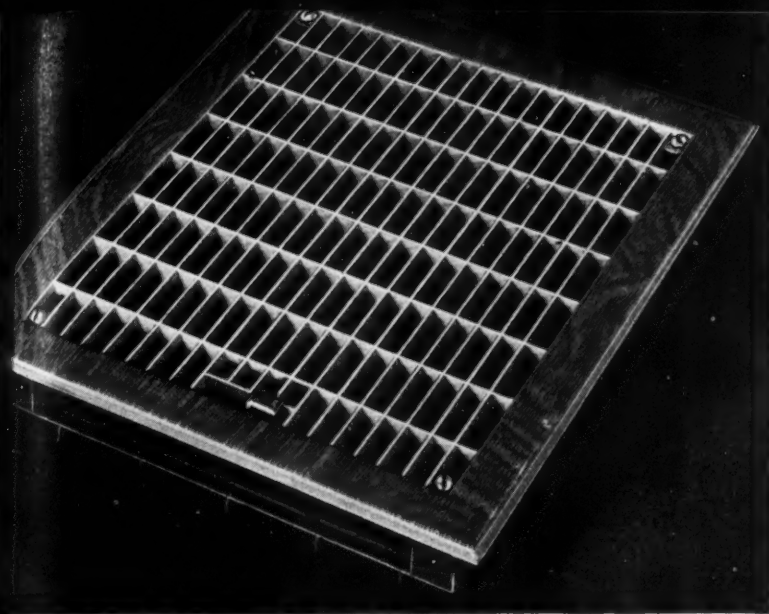
General Offices: Waterbury, Connecticut

Subsidiary of Anaconda Copper Mining Company

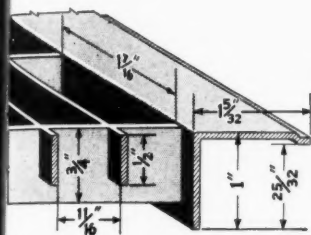
In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

4233 A





No. 210 FLOOR REGISTER Standard mesh  $\frac{7}{16}$ " x  $1\frac{7}{16}$ "

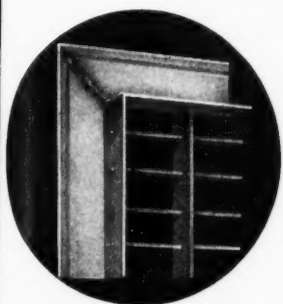


Cross Section of No. 265 in 4"-18" widths x 4"-60" lengths. Larger sizes are made with deeper braces for greater rigidity.

H & C "NO-FLEX" Registers and Return Air Faces are exceptionally strong and rigid due to the fact that the cross members are welded to each other and to the frame at frequent intervals.

Cross members have squared edges for improved walking surface and better appearance. ALL ITEMS IN THIS SERIES HAVE UNUSUALLY LARGE AIR CAPACITY.

Top-notch workmanship with careful attention to each and every detail, and finishes of lasting attractiveness assure maximum satisfaction. Your customers will appreciate the superior quality of these deservedly popular items.



Illustrating the manner in which corner joints are welded on underside.

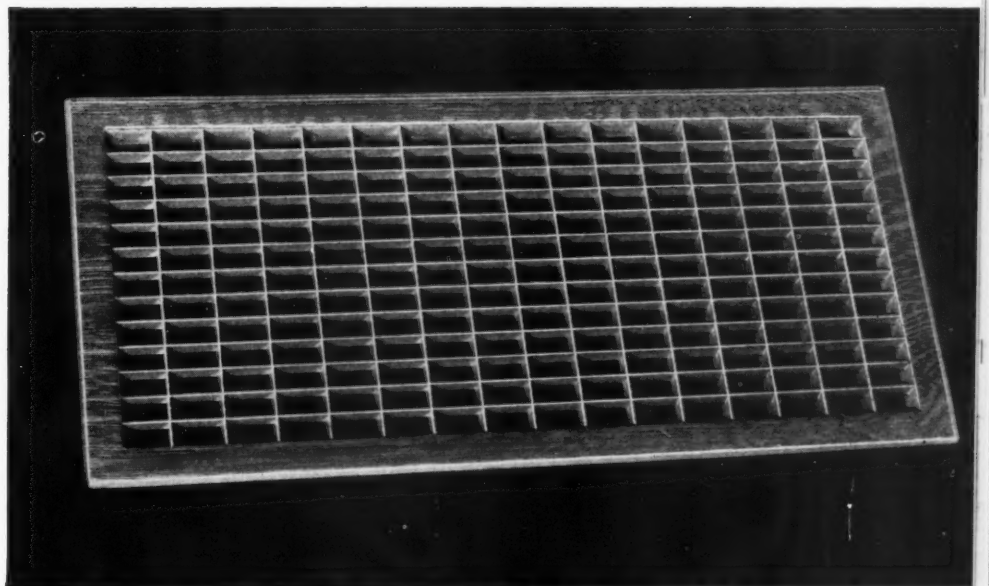
# H&C NO-FLEX

## Registers and Return Air Faces

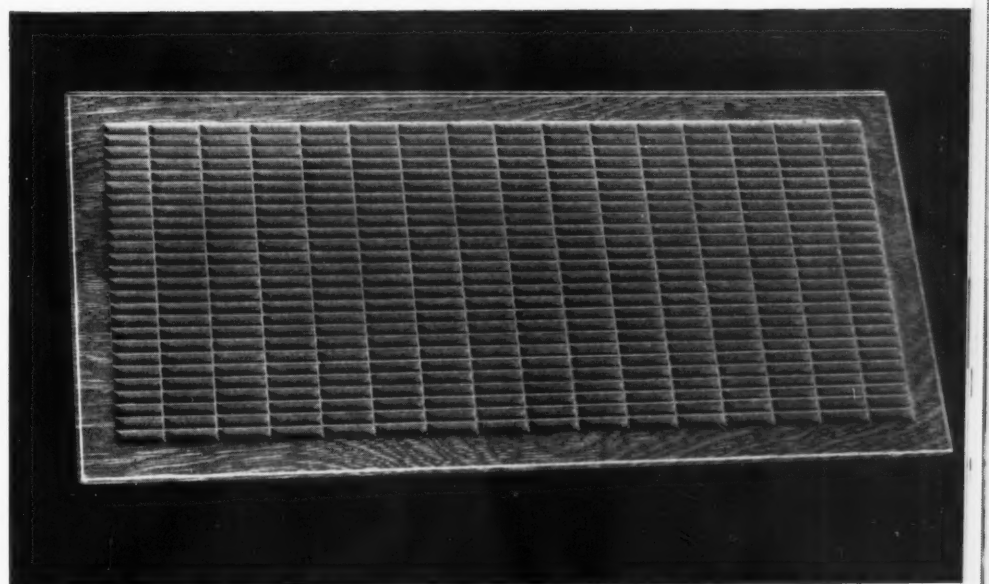
These **OLD RELIABLES** are "TOPS"!

—Whether for Wartime Housing or Routine Heating and Repairs

New importance attaches to gravity registers under present conditions. Give your proposal an inside edge by submitting H&C "NO-FLEX" Registers and Faces. Why not use the **BEST** when they cost no more?



No. 265 RETURN AIR FACE Standard mesh  $\frac{1}{8}$ " x  $1\frac{7}{16}$ "



No. 266 RETURN AIR FACE Standard Mesh  $\frac{5}{16}$ " x  $1\frac{7}{16}$ "

# HART & COOLEY MANUFACTURING

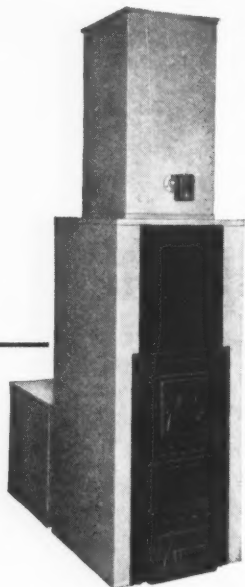
Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain

HOLLAND



MICHIGAN

Current Catalog: No. 42 combining Gravity, Air Conditioning and Furnace Accessory



Cabinet of sheet metal is neatly finished in smooth gray baked enamel with cast front in heat-resisting black. Inner liner forms insulating space.

# What's Inside the New MONCRIEF No. 16 Forced Air Furnace

## *Specially Designed for Low Cost Homes*

New conditions have set up new requirements in home heating equipment; and Moncrief, fully alert to the situation, has designed the No. 16 which fully meets present-day demands in every particular. A high-grade cast unit of high efficiency, 60,000 B.t.u., it has everything you are looking for in heating ability and appearance; and it is priced to get business for you and pay a reasonable profit.

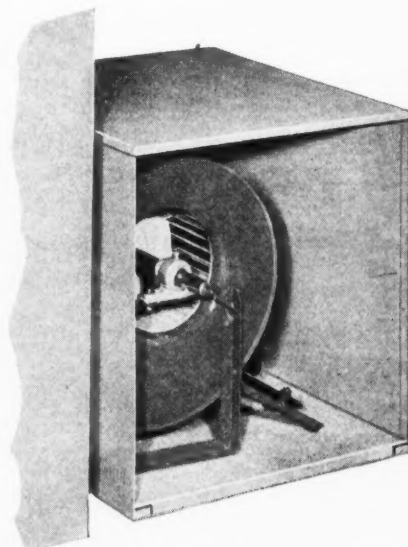


**CAST IRON HEATING UNIT** is substantially made and smoothly finished so that sections go together tightly. Radiating surface is extra large with correct proportions—19 to 1. Dome-type radiator is self-cleaning. Openings of feed section and ashpit are integral with the sections and extend through the front, eliminating all vertical joints. Feed door is equipped with chamber for preheating air. Slip-on cast front. Furnace can be completely assembled with pair of pliers and screwdriver.

**FORCED AIR CIRCULATION.** Squirrel-cage type blower is powered by 1/6 HP motor, fiber-mounted to absorb vibration. Cabinet is made with removable side to facilitate servicing, and construction permits servicing from the most accessible side.

**ASHPIT** opening extends through cast front. **FOUR TRIANGULAR BAR GRATES**, each bar individually operated with lever handle in front. Grates can be easily removed and replaced.

Send for Circulars



**AND don't forget your old friend  
The Famous Series C Cast, the Standard of Quality**

Made in 18", 20" and 22" sizes for defense housing needs. Series C has made a reputation for scien-

tific design, fine appearance and quality construction. Has every feature that increases efficiency and promotes fuel economy.

**THE HENRY FURNACE & FOUNDRY CO., 3473 E. 49th St., Cleveland, Ohio**



## Where trustworthy tools are vital



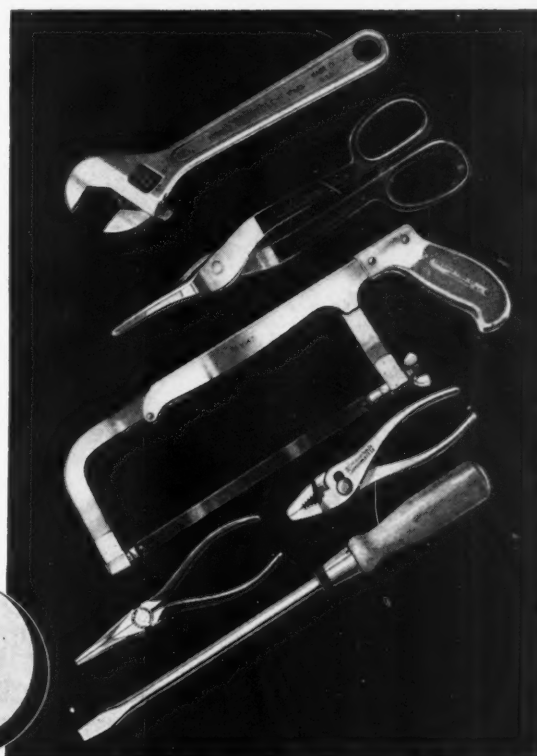
Without it, modern wars cannot be fought. Eliminate it from the diet of armies, and they revert to men on foot and horseback. That's OIL ... the black gold so vital in war, so essential in peace.

That our ultimate victory will be speeded because of America's great petroleum reserve, there is little doubt. The job of keeping oil flowing calls for hard work and good tools. All through the oil country you'll find Crescent Tools carrying their share of the load.

Crescent Tools include adjustable wrenches, pliers of all types, hacksaws, snips, screwdrivers, etc., etc. They are sold under the "Crescent" and "Cres-toloy" trade names by hardware and industrial distributors everywhere.

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

**CRESCENT TOOLS**  
*Give Wings to Work*





# SKILDRILL

1/4 IN. CAPACITY - MODEL 45

NEW!

*The Mightiest Mite  
of the Drill Field!*

ONLY 6<sup>5</sup>/<sub>8</sub>" OVERALL!

IT packs a world of drilling speed and power in the palm of your hand—the new SKILDRILL is so small, so light, so compact, it gets into the tightest places . . . yet it's a bear-cat for work, wherever 1/4-inch drilling is needed.

Take a SKILDRILL in your hand, look at its features, watch its performance and you'll want to have it handy in your plant—for precision production drilling, for installation or assembly work. Compact die-cast body, helical cut gears and 100% anti-friction bearing construction mean easy handling and smooth performance. Powerful Universal motor means fast drilling up to 1/4 in. in steel, 1/2 in. in wood. SKILDRILL is a drill you should have . . . it's a drill you will want, once you see it in action. ALSO 22 OTHER POWERFUL MODELS.

SKILSAW, INC., 5029 Elston Avenue, Chicago

New York • Boston • Buffalo • Philadelphia • Cleveland • Detroit • Kansas City  
Atlanta • New Orleans • Dallas • Los Angeles • Oakland • Seattle • Toronto, Canada

**SKILSAW** **PORTABLE ELECTRIC** **TOOLS**

YOUR DISTRIBUTOR WILL GLADLY DEMONSTRATE THESE TOOLS ON YOUR WORK

★ WEIGHS ONLY 2<sup>3</sup>/<sub>4</sub> LBS.

100% ANTI-FRICTION  
BEARING CONSTRUCTION  
★ Sells for only

**\$32<sup>50</sup>**

# CHRYSLER AIRTEMP DEFENSE HEATING EQUIPMENT

1

## Requires a Minimum of Critical Materials

Airtemp's Oil-fired Defense Housing Furnace weighs 253 pounds—less than  $\frac{1}{2}$  the weight of steel—and less than  $\frac{1}{3}$  the weight of cast-iron furnaces. Non-metallic ducts save hundreds of additional pounds of metal. Total savings in a 5-room home may be more than 1,000 pounds!

2

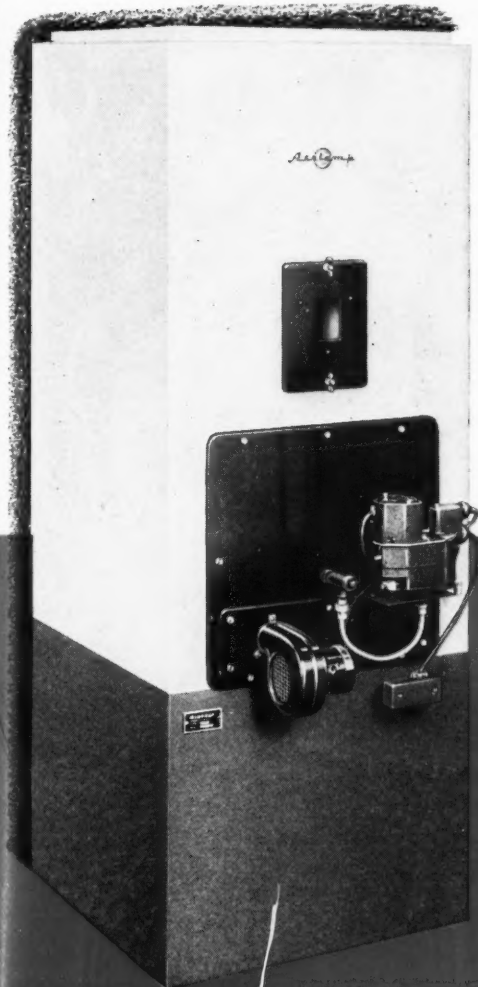
## Provides Better Service

Airtemp's Oil-fired Defense Housing Furnace is completely automatic—whether gravity, forced-air, or winter air-conditioning service is provided. Everyone knows that modern automatic heat provides a better service than old-fashioned hand-regulated heat!

3

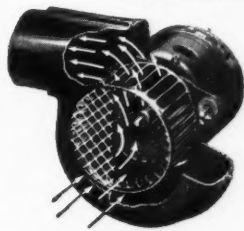
## Costs No More to Buy or Operate

Chrysler engineering and mass production methods have made these modern, all-steel, automatic furnaces available at a cost equal to the average cost of hand-fired equipment! Operating cost, with oil at 7¢ a gallon, and coal at \$9 a ton, is the same!



● This is the Airtemp automatic oil-fired Vapor-flame Furnace. Both gravity and forced-air models are equipped with Sure-draft fan for efficient combustion.

### MECHANICAL DRAFT FAN



Cutaway view of Sure-draft fan which provides constant, even supply of oxygen for the oil flame—means a clean, efficient flame even in damp or rainy weather. Automatically controlled by thermostat.

**CHRYSLER AIRTEMP**  
AIRTEMP DIVISION OF CHRYSLER CORPORATION, DAYTON, OHIO

*Clip and Mail the Coupon! Get All the Facts!*

AIRTEMP DIVISION, DEPT. AA-3  
Chrysler Corp., Dayton, Ohio

GENTLEMEN:

Please send me more information about the two  
Airtemp Low-cost Defense Housing Furnaces.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

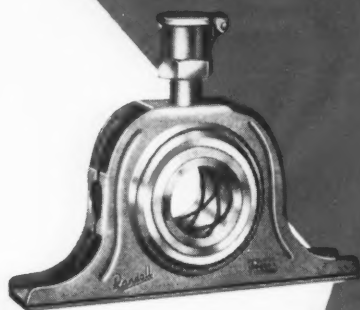
# DEPENDABLE BEARINGS WILL HELP US WIN THIS WAR

USE

*Randall*

## PILLOW BLOCKS

to keep the shafts of  
war production rolling



One-Piece Steel Housing  
Pillow Block



Universal  
Pillow Block



Flange or Side  
Mount Pillow Block

Turn, shafts, turn! Deliver the power, the drive, the action that will win this war!

Pledged to the big job of arming the nation, industry needs every effort, every resource. Through every man-hour, day and night, the turning shafts of our magnificent industrial machine speed ever greater war production. Propellers, wheels, gears . . . the shafts that turn them depend on efficient bearings to bring us *Victory*.

**RANDALL BEARINGS HAVE BEEN  
INSTALLED ON ALMOST EVERY TYPE  
OF WAR PRODUCTION EQUIPMENT**

If increased production has created new bearing problems for you, consult Randall engineers

about adapting Randall Pillow Blocks to meet your requirements. Self-aligning and self-lubricating, Randalls are dependable, quiet, inexpensive. They are trouble-free and easy to install, and give an extra lifetime of service in the field with only minimum attention.

### REPRESENTATIVES

C. W. Marwedel  
San Francisco, Cal.

Salt Lake Hardware Co.  
Salt Lake City, Utah

Edward D. Maltby Co.  
Los Angeles, Cal.

Tek Bearing Co.  
177 Lafayette, New York City  
1192 Commonwealth Ave., Boston, Mass.

*Don't Delay, Write Today*

**RANDALL GRAPHITE PRODUCTS CORPORATION**

DEPT. 311,

609 W. LAKE ST.

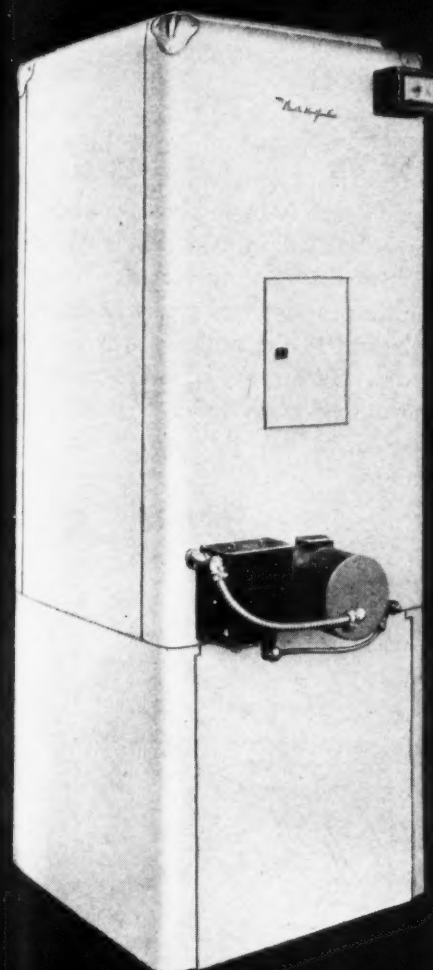
CHICAGO, ILL.



THE CHANCE OF A LIFETIME!



# Get in the Defense Housing Business with **NORGE** OIL HEATING UNITS!



## NEW NORGE MODEL OD-70

Occupies only 26 inches square floor space! For utility room or closet! Fully automatic pressure vaporizing burner. Modern cabinet with beautiful pearl gray baked enamel finish.

HERE'S an opportunity no alert sheet metal or heating contractor can afford to overlook! Norgé automatic Oil Heating Units are now sold *factory direct*!

This means you can sell at lower prices—meet any competition—and still make more money. You also have the advantage of offering the finest and most complete line of automatic oil units on the market, all designed specifically for defense housing—everyone packaged and factory-wired for quick, low-cost installation—everyone a superior value backed by the world-famous name and resources of the NORGE BORG-WARNER organization.

So don't delay! You're the logical, qualified man for this business. The time to act is now! Write Norgé for full details concerning territory franchises today!

## NORGE HEATING and CONDITIONING DIVISION Borg-Warner Corporation

12345 KERCHEVAL AVENUE • DETROIT, MICHIGAN

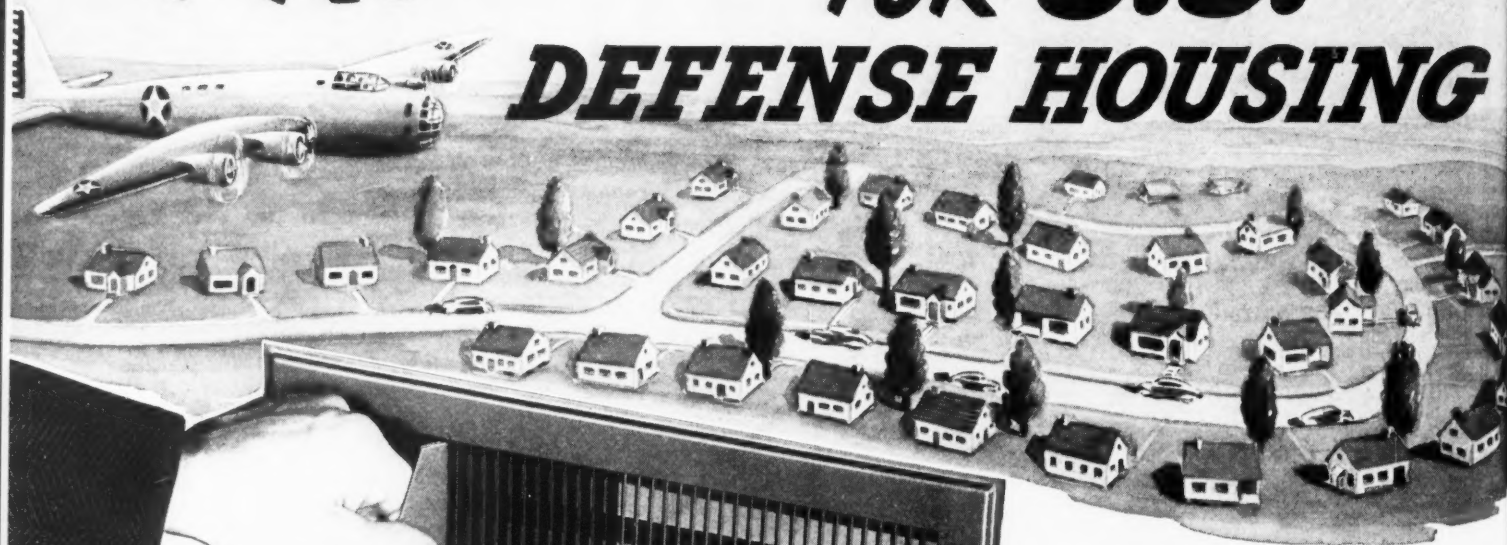
*Low Cost, Streamlined Norgé Oil Units Are Adaptable to Every Type of Defense Housing. Approved for FHA Installations.*



**FORGE AHEAD**

**WITH NORGE!**

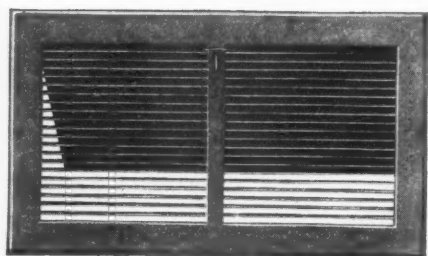
# An "ALL-OUT" PRODUCTION DRIVE FOR U.S. DEFENSE HOUSING



**K**EEP morale high in the homes of war production workers. Speed up the installation of comfortable heating systems. This is the best way now for the great heating industry to make its contribution to the nation's war program. Here at U. S. we're doing our utmost in an "all-out" production drive on defense housing orders.

## U.S. No. 256 Air-Conditioning Registers

4-Way Flow . . . full face coverage . . . minimum resistance . . . everything about these registers stamps them as the most efficient and mechanically perfect Multiple-Valve Registers made. See the Catalog 41-AC for complete details.



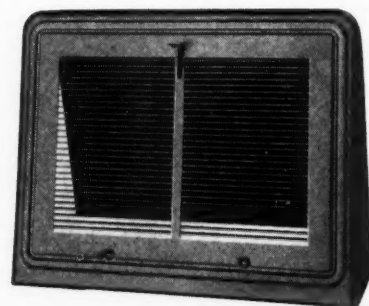
## U.S. No. 153 Air-Conditioning Registers

(Louver-Type Grille, Single Valve)

The LOWEST COST, NON-VISION, DIRECTED AIR-FLOW register. Suitable for ANY TYPE of air-conditioning installation.

## U.S. No. 40 Series Gravity Baseboard Registers

The pace-setters among gravity baseboard registers ever since their introduction. Acclaimed by heating contractors everywhere for MORE FREE AREA . . . LESS RESISTANCE . . . NON-VISION . . . TWO-PIECE CONSTRUCTION . . . METALAC FINISH AT BLACK JAPAN LIST . . . and their ADAPTABILITY FOR CONVERSION at any time to MODERNIZED AIR-CONDITIONING SYSTEMS. They are ideal registers for the gravity systems of Defense Housing Projects.



Send for latest Catalogs and Prices



# UNITED STATES REGISTER CO.

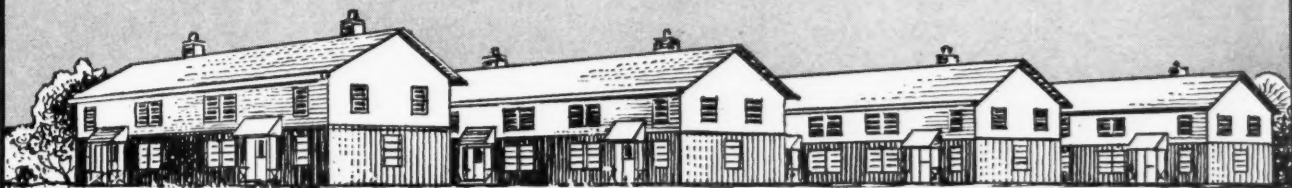
BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

CANADIAN MANUFACTURING DISTRIBUTORS—Canada Register & Grille Co., Toronto, Canada



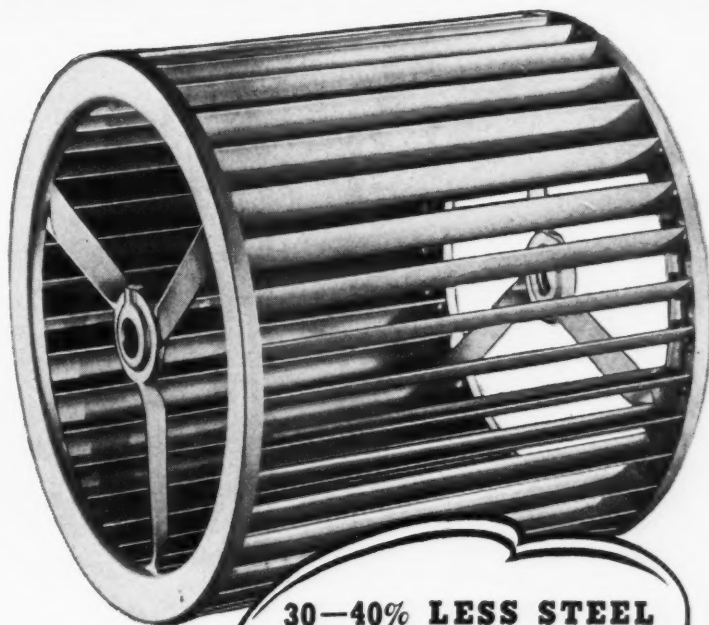
# Let **MORRISON** *Airstream* **BLOWER WHEELS HELP YOU WITH DEFENSE HOUSING CONTRACTS**



**AIRSTREAM** Blower Wheels use less steel per CFM air delivery. Weigh less, yet more rigid due to patented construction and channel-shaped end rings.

You save because of our savings in steel and labor, which we pass on to you. Patented hub construction supplants heavier and more expensive cast iron or screw machine hubs.

**FURNACE** Manufacturers—To compete in this new low cost market build blower assemblies in your own sheet metal shop. You cannot afford to pay someone else's overhead and profit on a product you can manufacture yourself. Morrison Engineers will furnish you complete information upon request.



**30—40% LESS STEEL**

★  
**FABRICATED ON  
AUTOMATIC EQUIPMENT**

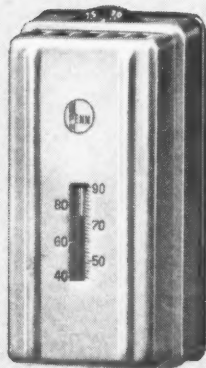
★  
**PATENTED  
CONSTRUCTION**

★  
**MORRISON PRODUCTS, INC.**  
EAST 168TH & WATERLOO ROAD  
CLEVELAND, OHIO

★  
**MORRISON IS CONTRIBUTING TO VICTORY BY CONSERVING STEEL!**



# FOR DEFENSE HOUSING JOBS AND FOR MAINTENANCE SERVICE



Thermostat



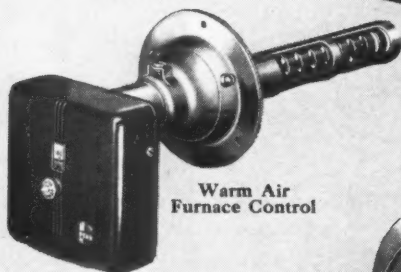
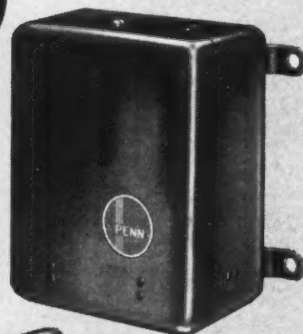
Day-Nite Clock

*Choose*  
**PENN CONTROLS**



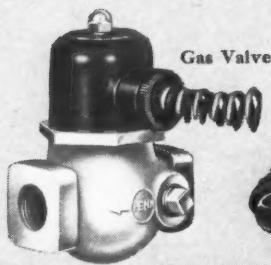
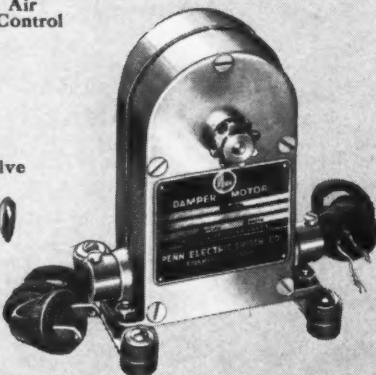
Stack Switch

Stoker Timer Relay



Warm Air  
Furnace Control

Damper Motor



Gas Valve

● More than 625,000 new homes are called for by the Defense Housing Program in 1942. Reliable estimates indicate that 200,000 existing homes in defense areas will require replacement of the heating plant—to say nothing of the many thousands which will need repairs and service.

It's a big war-time job for you men who install and service heating equipment. And it's a job in which Penn Controls can play a big part...because efficiency and economy must be twin watch-words in '42.

Temtrol—Penn's heat anticipating thermostat—provides accurate temperature control within narrowest limits...there are no wasteful wide swings and over-runs. All Penn Controls operate dependably, promoting economy whatever the system and whatever the fuel.

"Business as usual" is out, for the duration, of course. Penn is working first for our armed forces. But we are doing our utmost, too, to support the heating industry in its vital war-time job. Penn Controls will be supplied as promptly as our direct defense commitments will permit.

For new installations and for service jobs, now, as always, you can depend on Penn. *Penn Electric Switch Co., Goshen, Indiana.*

**PENN**  
**CONTROLS**

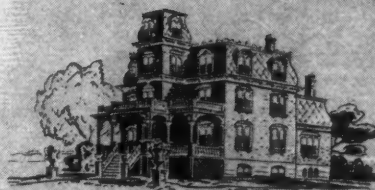
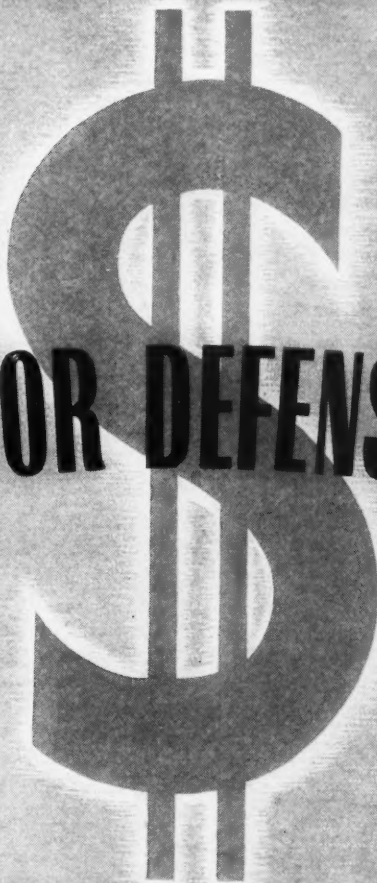
REFRIGERATION, AIR CONDITIONING, ENGINE,

HEATING, PUMPING AND AIR COMPRESSOR



Private builders will plan and build 400,000 defense homes under priority this year.

# BILLIONS FOR DEFENSE HOUSING

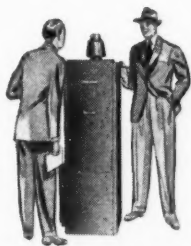


By converting old-fashioned residences into several living units, 420,000 apartments will be created.

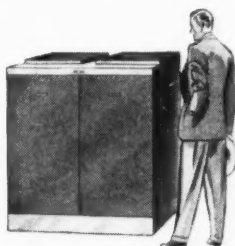
TURN TO



## ... for equipment to HEAT your share of this vast market!



This G-E Gas Warm Air Unit comes to you completely factory wired and assembled for easy installation. Smallest size occupies only 3½ sq. feet floor space. Three models; ranging from 48,000 to 96,000 Btu output per hour.



Winter Air Conditioners (oil or gas) in several sizes, for small and medium size homes.

Right from one dependable source you can get heating equipment for every type of defense housing project. General Electric units save time and labor on your part, too. Units for typical defense homes, especially, are easily and quickly installed.

G-E heating equipment is priced to meet competition. It offers you real profit possibilities in this war-time market—for builders everywhere know G-E quality and acceptance. Send the coupon now for details.

### GENERAL ELECTRIC

GENERAL ELECTRIC CO., Div. 2533, Bloomfield, New Jersey

Please send me details on G-E Heating Equipment for Defense Housing.

Name

Address

City  County  State



He

---

REPUBLIC *Enduro*



# *e never stops trying to help you*

## **CALL YOUR REPUBLIC SHEET DISTRIBUTOR FIRST!**

Give him a chance to help you solve your sheet supply problem. He wants to serve you—and *can*, in many ways. He may not be able to give you all the sheets you need—Republic Steel, U-Loy\* Copper-Bearing Steel, Enduro\* Stainless Steel, Toncan\* Iron, Taylor Roofing Terns—but he'll never stop trying.

When you put your problem up to the Republic Sheet Distributor, he tackles it as if it were his own. For today, *your* worries are *his* problem and his business depends upon his solving them. So he has simply rolled up his sleeves and buckled down to the job of using all his facilities overtime to give you emergency service *now* to help speed *Production for Victory*.

\*Reg. U. S. Pat. Off.

He may be able to supply a few sheets for small jobs, and even larger quantities for defense work. He'll go the limit to get sheets for you. Often he can supply other sizes and grades of sheets that will serve nearly as well. He can suggest ways to reduce waste and conserve supplies. His booklets on the fabrication and welding of Enduro Stainless Steel may be helpful to you. There's no let-up in his service.

On sheet supply problems, call your Republic Distributor *first*. He's a good man to have working for you. Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio—General Offices, Cleveland, Ohio.



# STAINLESS STEEL



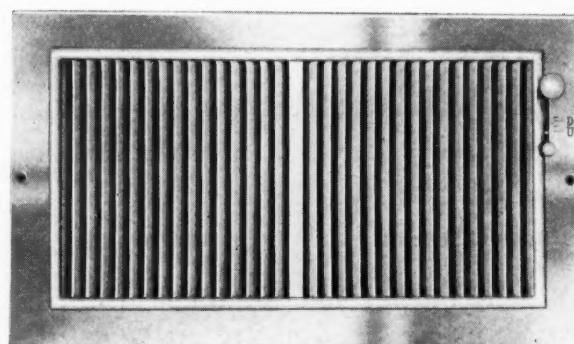
**THE IDEAL COMBINATION"**



*That's what Smart Dealers are saying about* **AIR CONTROL'S** SERIES **NO. 10** AND **NO. 110**  
**AIR CONDITIONING REGISTERS AND GRILLES**

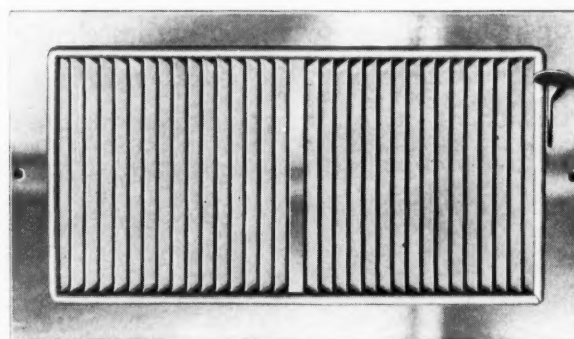
A combination of No. 10 and No. 110 Series Registers means — **maximum performance with a minimum cost!** Because both of these registers have the same face design, they may both be used on the same installation with uniform appearance. This makes it possible to use No. 10 Series Registers where adjustable **dual** control is desired, and No. 110 Series where up and down control is not required and the utmost in economy is essential. An ideal application is the use of No. 10 Series for all supply registers, because of their positive control of the air flow—both horizontally and vertically, and No. 110 Series for return air intakes, where it is desirable to close the intakes. This results in a marked saving in installation costs—without sacrificing efficiency. The use of the same grilles and intakes makes this combination easy to stock.

This feature also makes AIR CONTROL the ideal combination for low-cost DEFENSE HOUSING.



**No. 10 Series Registers and Grilles**

Adjustable vertical fins, plus adjustable horizontal louvered valve—adjustable control in all planes.



**No. 110 Series Registers**

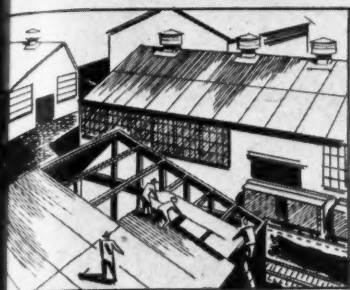
Adjustable vertical fins with single shutter valve—a high quality register at a low price.

*Write today for information on the complete AIR CONTROL Line—the accepted line for America's Defense and Civilian Requirements! Air Conditioning Registers—Dual Control Type, Vertical Fin Type, Horizontal Fin Type—Gravity Registers—Floor Registers and Faces—Attic Louvers—Damper Control Sets.*

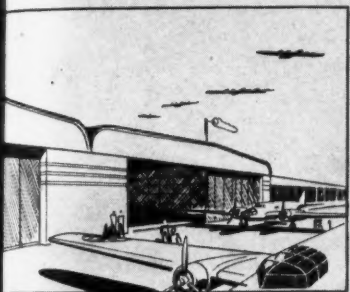
***Air Control Products, Inc.***

**COOPERSVILLE  
MICHIGAN**

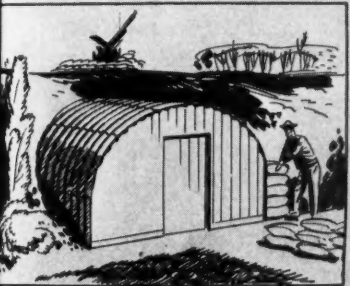
## New Jobs for Sheet Metal Plants



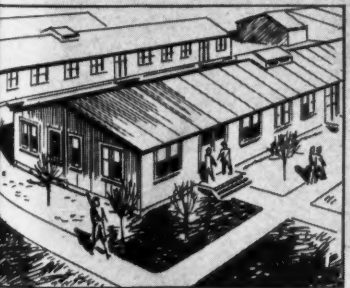
**PLANT EXPANSIONS** — You can get them under roof faster with corrugated metal construction. U·S·S Copper Steel gives them durable durability.



**AIRPLANE HANGARS.** A natural for corrugated metal construction. Can be quickly installed and quickly moved. Have large salvage value.



**AIR RAID SHELTERS.** Built from heavy corrugated U·S·S Copper Steel Plates. Can be installed by sheet metal workers.



**PORTABLE BUILDINGS** for the fighting forces can be made of U·S·S Steel Sheets and insulated to keep out heat and cold.



## WHY YOU SHOULD USE *double-life* COPPER STEEL FOR LOW-COST DEFENSE CONSTRUCTION

1. U·S·S Copper Steel *definitely* lasts two to three times as long as plain steel. This has been proved conclusively by unbiased atmospheric tests over a period of 21 years, by the American Society for Testing Metals.
2. The cost of U·S·S Copper Steel is so close to that of plain steel that it adds *less than one dollar* to the cost of the sheet metal work in the average building under \$6,000. This means little if any change in the contract price.
3. U·S·S Copper Steel *saves* steel over a period of years by making products last twice as long. Where corrosion is severe as in gutters, flashings, downspouts and duct work it would be an economic waste of steel *not* to use the more durable product.
4. It may soon be necessary to use uncoated sheets instead of galvanized for some applications. When steel is uncoated, it is extremely important to use a steel with high corrosion resistance.
5. Every product entering service today should be made to last as long as possible. Replacements may be impossible to get.
6. Fast work is possible with U·S·S Copper Steel because it forms easily and lends itself to prefabricated work.
7. If you are working on important war construction, you will probably be able to get U·S·S Copper Steel as easily as any other type of sheet metal.

Get the complete facts on U·S·S Copper Steel for construction uses by writing to any of the companies below.

## U·S·S COPPER STEEL SHEETS



CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago  
COLUMBIA STEEL COMPANY, San Francisco  
TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

Scully Steel Products Company, Chicago, Warehouse Distributors  
United States Steel Export Company, New York

# UNITED STATES STEEL



# Speed

## WAR CONSTRUCTION

### With This PAINT-GRIPPING Metal



Galvanized ARMCO PAINTGRIP sheets are real time- and money-savers on many types of priority construction. Because they offer a paintable, paint-preserving surface over the standard galvanized coating, they help speed the work and assure a durable installation.

For example: ARMCO PAINTGRIP was used for corrosive exhaust ducts where it replaced costly, cumber-

some materials. The work simply was shop-formed and dipped in an acid resisting paint. This made for a quickly-installed, inexpensive duct system that withstands corrosion.

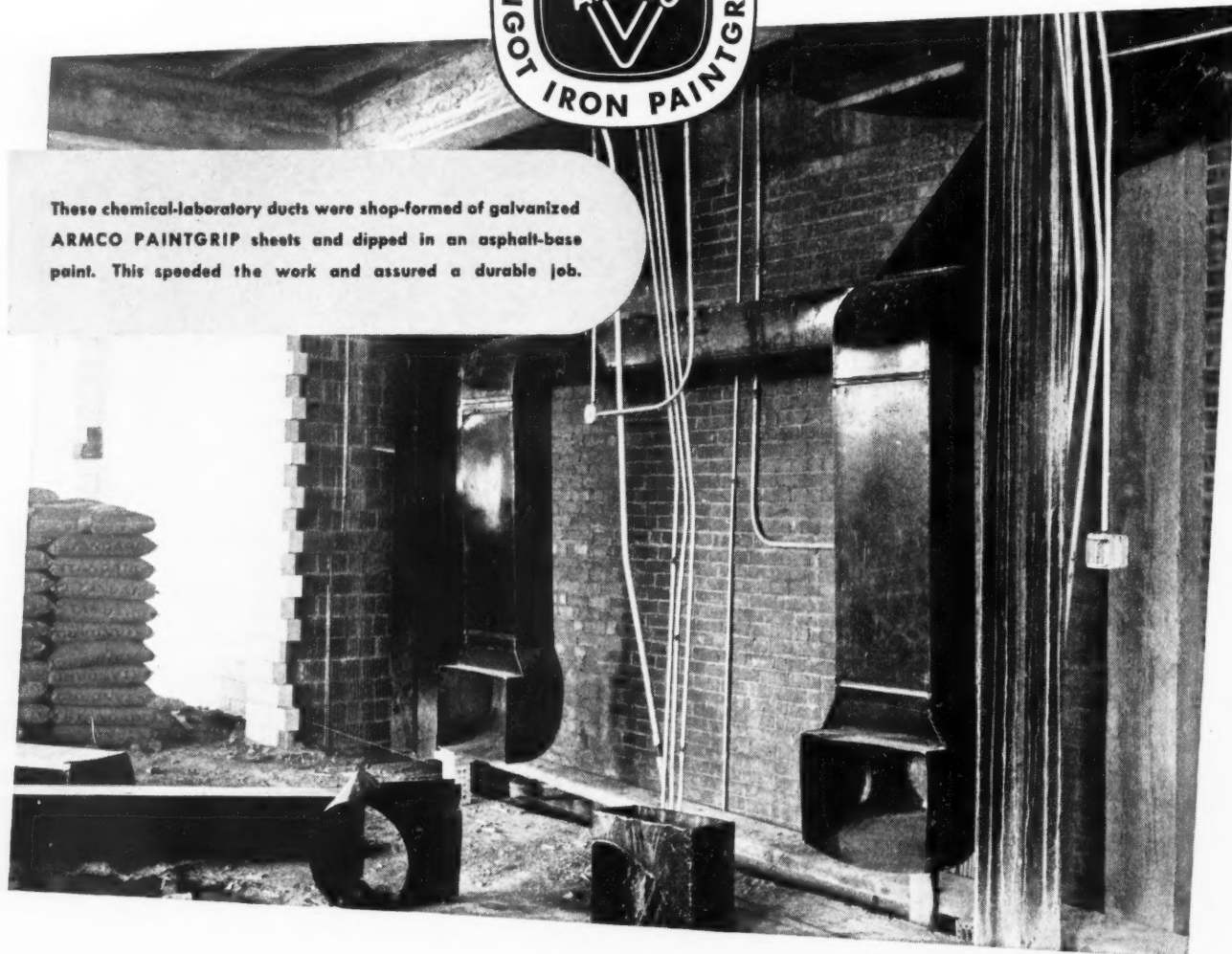
Galvanized ARMCO PAINTGRIP is the *original* mill-bonderized sheet

metal. Its special phosphate-treated surface takes paint immediately and holds it in a tight, durable bond. No acid-etching is needed.

Use ARMCO PAINTGRIP sheets for your high "A" priority work. We'll gladly help you adapt it to your requirements with suggestions and all the technical data you need. The American Rolling Mill Company, 890 Curtis St., Middletown, Ohio.



These chemical-laboratory ducts were shop-formed of galvanized ARMCO PAINTGRIP sheets and dipped in an asphalt-base paint. This speeded the work and assured a durable job.

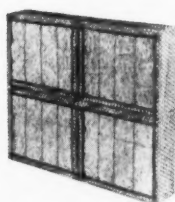




## ..... IN EVERY GROSS OF TAMPICO FILTERS!

Used Tampico Filter Frames are worth money. Instead of throwing them away, snip the wires, remove the Filtering Material and pack the empty frames (in reasonably good condition) into their original or other discarded cartons. When you have a minimum freight shipment, return them to us. We'll pay freight charges and we'll pay you 5c for each frame received! Help conserve materials for the war effort, and help yourself to an extra \$7.20 profit per gross.

### TAMPICO ASPENWOOD FILTERS

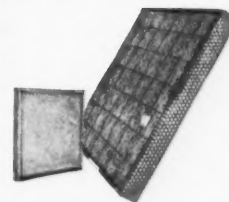


... are made of 100% pure, white Aspenwood fibre, thoroughly cleaned of all foreign matter and scientifically processed and graded for maximum evaporative cooling efficiency. The partitioned frame prevents the fibre from sagging and allowing air leaks,

and careful packing eliminates extra thin or extra dense areas—assures an even flow of air and an even distribution of water over the entire filtering surface. As explained above, we re-purchase used frames and, since this type is more costly, we allow from 25c to 75c for each frame returned.

### TAMPICO FILTERS (REGULAR)

In addition to its cash value when used. The Tampico welded, all-steel frame helps the filter do a better job over a longer period of time because it permits more frequent tappings or cleanings. Ultimate dirt clogging is postponed — filtering efficiency is s-t-r-e-t-c-h-e-d. Send the coupon for your free sample.



**CHICAGO FILTER CO. • Joliet, Illinois**

Chicago Filter Co., Joliet, Ill.  
Gentlemen: Please send me: ( ) Free Sample Tampico Filter ( ) Facts on Tampico Aspenwood Filters.

Name .....

Address .....

City ..... State .....

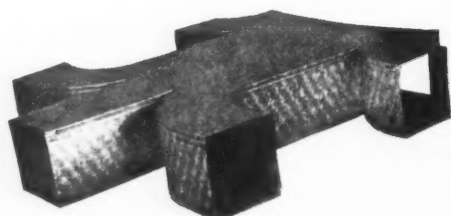
## TAMPICO FILTERS

"The World's Largest Exclusive Air Filter Manufacturers"

...where ***SPEED*** is the essence

USE THE **LOCKFORMER-APPTON** COMBINATION:

FOR THE FITTING SHOWN, AS AN EXAMPLE,  
FABRICATION TIME IS AS FOLLOWS:



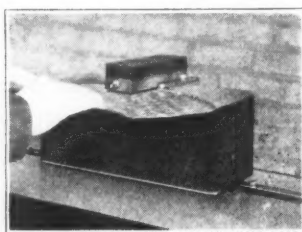
FOR MAKING 12  
PITTSBURGH LOCKS

FOR FLANGING BOTH  
SIDES (22 Lineal Feet)

FOR FLATTENING HAMMER-  
OVER EDGE (22 Lineal Feet)



One man and a Lockformer can make more Pittsburgh Locks than *sixteen men working at eight brakes*. Auxiliary rolls (except on the Model 24) make Drive Cleats and Double Seam Locks with similar speed. *Extra* profits, because of tremendous savings in labor, quickly repay your investment.



This Power Flanger Attachment (which can be fitted to your present Lockformer Model 20, 22 or 24) turns Right Angle Flanges on either straight edges or on curved edges having a radius as small as  $1\frac{3}{4}$  inches. It does not interfere with any other Lockformer operation—is always ready for immediate use.

*Write us for facts on any of the above equipment.*



The Appton Super Air Hammer is the ideal "running mate" for your Lockformer. It flattens the hammer-over edge of a Pittsburgh Lock just about four times as fast as you can do it with a hand hammer—turns a tiring job into a speedy, simple one. It can also be used for concrete drilling and a host of other tasks in the shop and on the job.

**THE LOCKFORMER co.**

4615 ARTHINGTON STREET, CHICAGO, ILLINOIS

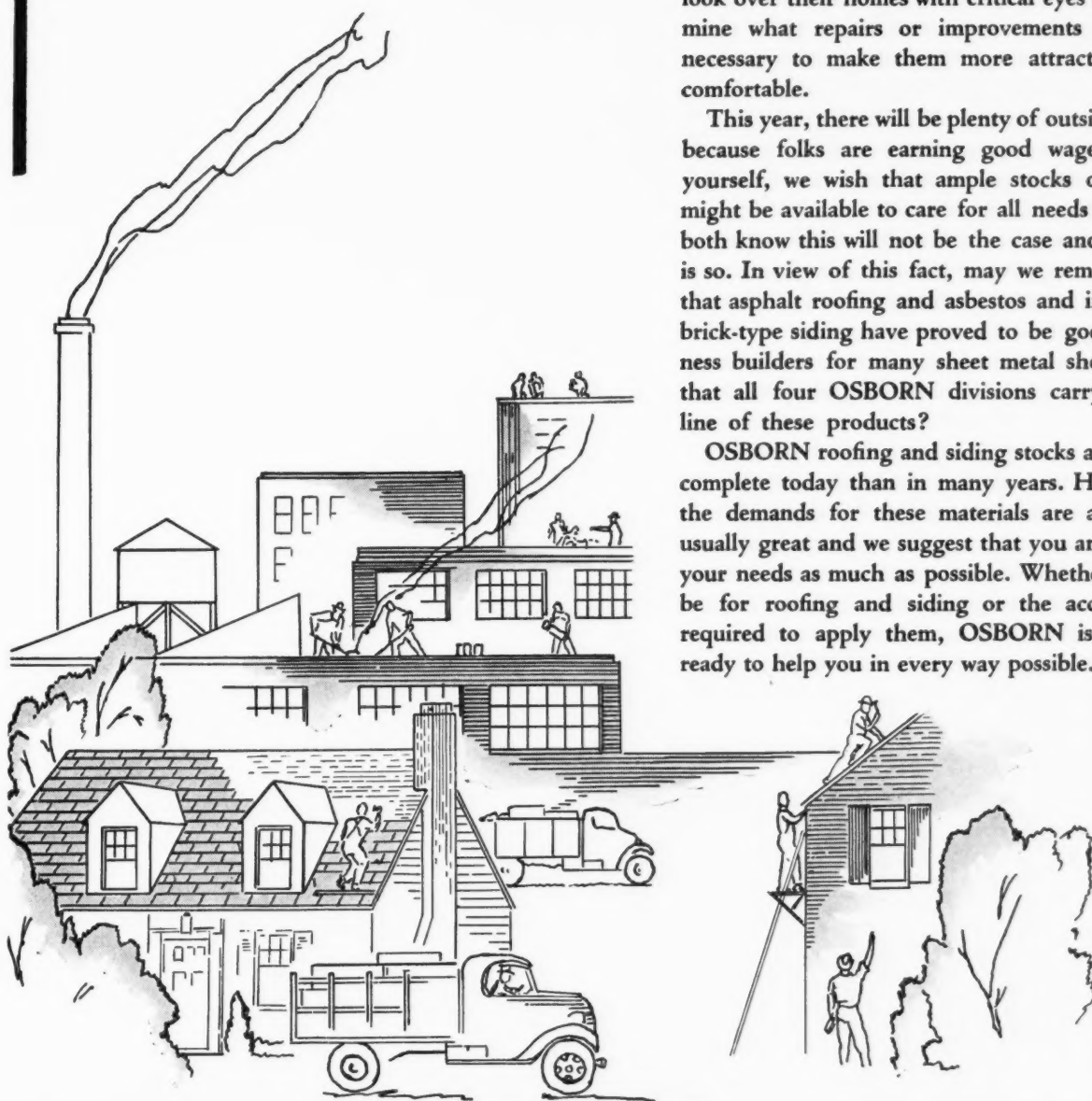


# This Spring—Roofing will Increase the Volume of Many Shops...

March is more than just the first month of Spring. It is the time when folks begin to get out-of-doors, to see the first green of the grass and to look over their homes with critical eyes to determine what repairs or improvements will be necessary to make them more attractive and comfortable.

This year, there will be plenty of outside work because folks are earning good wages. Like yourself, we wish that ample stocks of metal might be available to care for all needs but we both know this will not be the case and why it is so. In view of this fact, may we remind you that asphalt roofing and asbestos and insulated brick-type siding have proved to be good business builders for many sheet metal shops and that all four OSBORN divisions carry a full line of these products?

OSBORN roofing and siding stocks are more complete today than in many years. However, the demands for these materials are also unusually great and we suggest that you anticipate your needs as much as possible. Whether these be for roofing and siding or the accessories required to apply them, OSBORN is always ready to help you in every way possible.

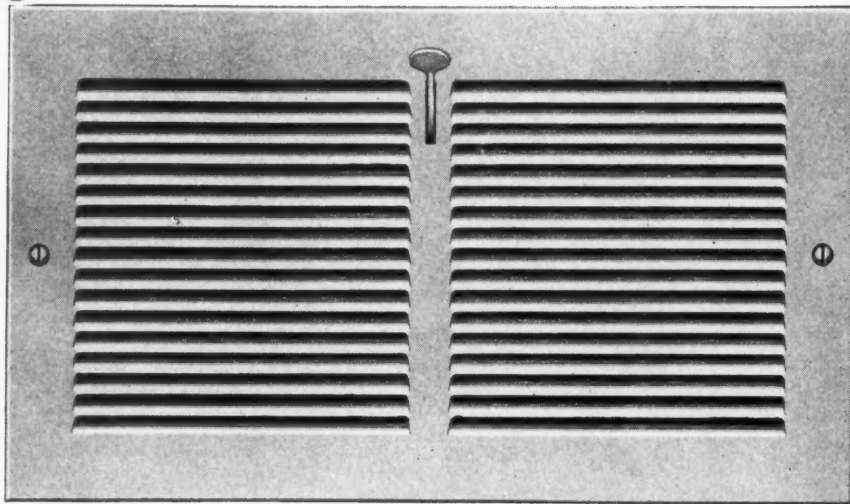


THE J. M. & L. A.  
**OSBORN Co**  
CLEVELAND, OHIO  
BUFFALO • CINCINNATI • DETROIT  
Distributors of Metals and Metal Products

ASPHALT SHINGLES AND ROLL ROOFING  
INSULATED BRICK-TYPE AND ASBESTOS SIDING  
FELTS—PAPER—CEMENTS—NAILS  
ROOFERS' TOOLS—LADDERS AND ACCESSORIES

A DEPENDABLE SOURCE OF SUPPLY FOR 83 YEARS

# **AUER** *Registers* **for Low Cost Homes** **and Defense Housing**

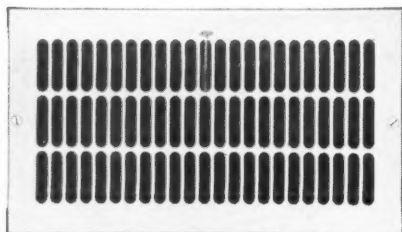


Air-Flex No. 7032

Auer has several types of warm air registers which are simple in design but well built and efficient, and which come within the cost requirements of the small home market. For any type of heating system in single unit or group housing, you will find that Auer has the proper model for your requirements.

For example, in a recent government-sponsored defense area housing project in Euclid, Ohio, all dwellings were equipped with the "7000" Airo-Flex Series Registers shown above. This is a high grade but inexpensive model with 1-piece face, the bendable fins being adjustable at time of installation for up or down deflection. It is a single louvre register, with ample open area and neat appearance.

Other Auer models, such as Classic Wall and Baseboard Registers, Heat-Rite Gravity Registers, and DuraBilt Floor Registers and Intakes are also well adapted to use in smaller homes. In any of these registers you have the assurance of traditional Auer quality.



In a recent government-sponsored project at Norfolk, Va., nearly 6000 of these Auer "6000" Line Classic Registers were installed.

*Write for new Auer Register Book showing all models for warm air and air conditioning.*

**THE AUER REGISTER CO., CLEVELAND, O.**

## **AUER REGISTERS** **& GRILLES · For Air Conditioning and Gravity**

# Figurin' the Angles

What smart men do in these times to make money with Fiberglas\* Dust-Stop\* Air Filters



## Use Dust-Stop's Free Sales Plan and Take Care of Tomorrow Today

WHAT ABOUT TOMORROW? How much more will shortages hit the metal trade? How will they hit you?

Don't let them. Fortify your business with sidelines, now . . . furnace-cleaning, burner-cleaning, repairing. Get yourself some profitable filter replacement business. And let the *free* Dust-Stop Sales Plan help you do it.

It's a sales plan that *is* a sales plan—It's got the biggest set of dealer helps in

the filter field!

It's got mailing pieces, newspaper mats, postcards, reminder labels, radio scripts . . . every one of them with your name and address imprinted *free*!

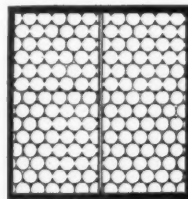
Backing up the selling power of this plan are national ads appearing in American Home, Better Homes and Gardens, Life, Saturday Evening Post. These ads are telling householders when it's necessary to change filters, telling them to get Dust-Stops.

Now, about the profit in filter replacements. It's O.K. Look! You can make about \$2.00 to \$3.00 per furnace, per year. Apply these figures

to 200 or 300 furnaces and you get a profit picture that's mighty pretty.

Don't forget, too, that Dust-Stop replacement work gets you in touch with prospects for other profitable jobs. Furnace-cleaning. Oil-burner adjusting. Repair work for all kinds of heating equipment.

So, don't wait. Write to your manufacturer or jobber. Tell him to mail you the free Dust-Stop Sales Plan right away. Or write to Owens-Corning Fiberglas Corporation, Toledo, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.



**FIBERGLAS\* DUSTOP\* AIR FILTERS**

T.M. Reg. U.S. Pat. Off.

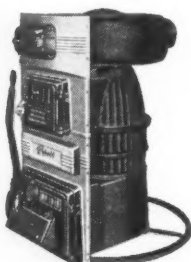


# RYBOLT



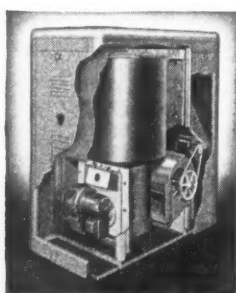
**RYBOLT SERIES DH-705  
FORCED AIR UNIT**

Very compact, Steel coal-fired heating element. Blower compartment can be mounted on side or rear of heating cabinet. Baked enamel finish.



**RYBOLT SERIES 1815  
18\"**

A compact, small capacity gravity furnace. One-piece radiator, feed section and ashpit. Attractive design.



**RYBOLT SERIES RO OIL-FIRED  
AUTOMATIC HEATING UNIT**

Compact. Completely automatic, quiet. Pull out burner makes it easy to service. Baked enamel finish.



Despite the restrictions of war, there's plenty of heating business to be had if you go after it. Even with civilian building out of the picture, the building program for 1942 is larger than last year.

Nearly \$600,000,000.00 of war housing offers an unusual market for small low cost homes. Not to be overlooked are the sales possibilities for such units in prefabricated demountable houses of which 70,000 are to be built this year at a cost of \$185,000,000.00. These prefabricated houses as well as practically all houses in the whole war building program require small, compact, low priced heating units.

You are in an extremely favorable position to get your share of this business with the RYBOLT line which includes a number of units especially adapted to meet the price and size limitation of war housing.

These low priced heating units—forced air and gravity—are specially designed to fit in limited space without any sacrifice of efficiency, convenience, or dependability. For war housing or any type of small or medium sized house, they completely solve the heating problem.

WRITE FOR DESCRIPTIVE LITERATURE



**THE RYBOLT HEATER COMPANY**  
**615 MILLER STREET • ASHLAND, OHIO**



## BITS and PIECES

### A-10 DOESN'T GET MATERIALS

A POINT of argument which has long perplexed contractors was brought out into the open at this month's Ohio convention. This argument is—"Why, if A-10 doesn't get galvanized iron in a given area does the local WPB office continue to assign A-10?"

The speaker said in some areas A-10 does get sheets—perhaps with some delay—and that so long as A-10 gets sheets in one area Washington is likely to continue to issue A-10's. And he explained the contractor could always ask for a rehearing and a higher rating.

If Washington wants houses built—in a hurry—it seems as though the necessary rating could easily and quickly be ascertained and such a rating issued in the first place. Everybody's time would be saved and a lot of letter writing and office visiting eliminated. If Government really wants to know what rating is necessary to get sheets a phone call to any local jobber would quickly tell the tale.

### THAT GAS FURNACE ORDER

When WPB's gas furnace order came out of the blue and caught 1942 conventions in full swing, the order probably caused as much perplexity and consternation as any event in 1941. Furnace manufacturers were right in the midst of producing a bumper crop of gas furnaces in anticipation of a continued preference for gas in new houses. Jobbers, likewise, were caught with heavy inventories. And contractors, in areas where gas has been booming, had furnaces on order or in stock for a big 1942.

While the rumor of the order was making the rounds the gossip made the situation blacker than it turned out to be, but the final wording has put a definite tuck in our sales programs for 1942.

Professor Konzo and our Wash-

ington correspondent, Arnold Kruckman, both have an opinion which is worth study.

These men say that rulings from Washington agencies now are controlled in the final analysis by the lawyers. Lawyers draw the bills; they make the rulings legal rather than scientific. Legally it is easier to apply a blanket ruling and then, later, take exceptions than it is to draw the initial bill to include the exceptions.

What will likely happen, we are advised, is that exceptions to the gas furnace ruling will be made as time shows that certain communities have plenty of gas; that their supply is not needed for any existing or proposed war products plants; that there is and will be plenty of gas to heat houses. Then, when this is proved, that community will be declared an exception and gas will be permitted for house heating.

### NINE-TENTHS OF ONE TIRE

A contractor told recently of his experience with a tire rationing board. He was using his truck to haul workmen from the shop in town to a new powder plant where he was installing ventilation ducts. The truck was also used as a "pick-up" for small job requirements. The plant is four miles from the nearest railroad station and there is no bus line.

The contractor's tires wore out—all four of them. Thinking that certainly a munitions plant contractor on a A-1-A project ought to rate tires he applied to his local rationing board. All he got was the information that tires would not be available for two months and even then, if he got his full allotment—all he would get was nine-tenths of one tire.

Of course, it's silly but that's the tire situation, in fact the graphic way of making it very clear we have no tires.

### STATION WAGONS ARE PASSENGER CARS

Salesmen who carry samples or small order supplies and contractors who use their passenger cars to haul men and small items to their jobs have been asking if a station wagon classifies as a truck and is, thereby, qualified for tires as a truck. Considerable cracker barrel opinion has been offered—many professing to "know" that a station wagon is a truck.

But disappointed will be all those who have placed their finger on a station wagon to be picked up second hand. Donald Nelson and WPB announced February 25 that Amendment No. 1 to Supplementary Directive No. 1A revises the definition of new passenger automobiles to include any 1942 model having a seating capacity of not more than 10 persons (it was previously 8 persons).

So you can still buy second hand station wagons, but a station wagon is not a truck and the chances to get tires are just as good as they are to get tires for the family bus.

### FHA's NEW HEATING CODE

At several conventions this year, speakers fresh from Washington have mentioned that FHA has a new heating code which departs radically from standard design and specifications. For instance, we have been told that—"150 pounds of metal (including furnaces, plumbing, nails, electrical supplies) will be all the metal available for a single house"; and that "500 pounds of metal will be allowed (if you want a 500-pound I-beam in the basement that uses up your allotment); and that "the only galvanized iron permitted for ducts in a house will be for elbows and fittings with everything in between to be a substitute"; that "there will be only three sizes of domestic furnaces—up to 55,000 Btu capacity, 55,000 to 65,000 Btu, 65,000 to 80,000 Btu—and that any house which exceeds 80,000 Btu heat loss must be insulated DOWN to 80,000 Btu loss".

There are other rumors connected with this code.

It seems likely that these rumors have some foundation because several of the men who have warned us what is coming are close to the Washington agencies and have been consulted previously on proposed changes.

All we know definitely is that  
(Continued on Page 108)

# New Defense Housing Critical List

Readers should understand that this new materials critical list is not directly a design or installation code for heating, but does constitute indirectly a code since it specifies the size of the house, the permissible heat loss, certain materials which may not be used, ratings on equipment, types of equipment. The systems we will be able to install must conform with these limitations. Paragraphs of particular significance have been identified by the pointing finger.

## 100—GENERAL PROVISIONS

### 110—Scope:

- 111—This list supersedes and nullifies the Defense Housing Critical List, PM-1192, dated September 19, 1941.
- 112—This list is based upon the critical positions at the time of issuance, of materials essential to the construction, allocation and equipment of housing, and is subject to revision by the Director of Industry Operations whenever warranted by a change in the critical position of the materials included.
- 113—Only the materials and products included in this list, and only in such limited quantities and for such limited uses as are herein specified or imposed by an applicable Preference Rating Order, are eligible for procurement by the extension of a Preference Rating Order granted for a housing project.
- 114—Materials not included in this list and not subject to allocation or priority control may be used without restriction or limitation, provided, however, that nothing herein is intended to limit the application of the provisions of Priorities Regulation No. 1.

### 120—Substitutes:

- 121—Materials or products of the sizes, weights or composition specified in the list may not be immediately procurable due to necessary changes in manufacturing processes or procedure. In such cases, the Preference Rating Order may be extended to secure delivery of similar products or materials previously produced for the same use, provided such delivery is made from the Supplier's existing stocks or inventory.

### 130—Definitions:

- 131—"Applicable Code or Regulation" means a code or regulation of a public body having jurisdiction, or a regulation or standard of a housing agency of the Federal Government constructing or aiding the financing of the project.
- 132—"Multi-family Dwelling" means a dwelling containing separate living units for three or more families with joint facilities or services or both. For the purpose of the Defense Housing Critical List, the term "joint facilities" means any one or more of the following which serve

three or more families: Entrance hall, stairway, storage or laundry facilities, bathroom or toilet, attic, heating plant, hot water generator, and electrical service equipment; the term "joint services" means janitorial and maintenance services.

## 500—HEATING

### 510—General:

- 511—The maximum net hourly output capacity of the heating unit or system as determined in 514 or 515 hereof is the capacity—after deductions have been made for piping and pickup, attached domestic water heaters, and non-dwelling heating loads—available to provide for the total hourly heat loss of the dwelling it heats. Such maximum net hourly output capacity in Btu shall not exceed 66 times the dwelling area in square feet or 80,000 Btu per dwelling unit, whichever is the smaller.
- 512—The total hourly heat loss of a dwelling shall not exceed such maximum net output capacity and shall be determined in accordance with the data and methods described in the current edition of the "Guide" of the American Society of Heating and Ventilating Engineers or by an alternate method which results in not less than the amount determined by the "Guide" method. Such total hourly heat loss shall be based on maintaining 70°F inside the dwelling when the outside temperature is at the design temperature for the locality. (Spaces such as unheated garages, attics and basementless spaces shall be calculated at outside design temperature.) Storm windows and doors furnished shall be credited with the heat loss reduction they effect.
- 513—Dwelling area is the total area used for dwelling purposes contained within the exterior walls at each principal floor level excluding garage and unfinished storage space but including only the finished area of any living, sleeping, dining or kitchen space located in the basement or attic.
- 514—Prior to sixty days after the effective date of this Defense Housing Critical List, the maximum net hourly output capacity shall be determined from catalog ratings in effect on said effective date. On or after sixty days after the



effective date of this Defense Housing Critical List only equipment rated in accordance with 515 hereof shall be eligible. Equipment may be rated within a range of specified firing rates selected by the manufacturer if at any firing rate within that range its performance certified by the manufacturer to have been determined by test is within the limitation of the applicable code or standard specified in 515.

515—Except as provided in 514 hereof, the maximum net hourly output capacity is determined as follows:

5151—*Floor Furnace:*

Gas-fired—90% of published, listed, or labeled output rating determined in accordance with the current "Commercial Standard" or "Recommended Commercial Standard for Gas Floor Furnace—Gravity Circulating Type," or 90% of the A. G. A. output rating.  
Oil-Fired—90% of the manufacturer's certified output rating at 70% or higher efficiency.

5152—*Space Heater*

Hand-Fired or Coal or Wood—90% of manufacturer's certified output rating at 60% or higher efficiency.

Gas-Fired—90% of A.G.A. output rating.

Oil-Fired—100% of the published, listed, or labeled rating determined in accordance with the current "Commercial Standard" or "Proposed Commercial Standard for Flue Connected Oil Burning Space Heater Equipped with Vaporizing Pot Type Burners."

5153—*Pipeless Gravity Furnace*

Hand-Fired Coal—90% of the manufacturer's certified register output at 55% or higher efficiency.

Oil-Fired—90% of the manufacturer's certified register output at 70% or higher efficiency.

5154—*Gravity Furnace*

Hand-Fired Coal—110% of the manufacturer's certified "Standard Gravity Code" rating in square inches leader area times 136 Btu.

Mechanically - Fired (Conversion installations)—Same as for Hand-Fired.

Gas-Fired (Furnace-Burner Unit)—75% of A.G.A. bonnet output rating.

Oil-Fired (Furnace-Burner Unit)—75% of the manufacturer's certified bonnet output at 70% or higher efficiency.

5155—*Forced Warm Air Furnace*

Hand or Mechanically-Fired Coal (Gravity rated Furnace with Fan Conversion)—100% of the manufacturer's certified "Standard Gravity Code" leader pipe area in square inches times 180 Btu.

Gas-Fired (Fan-Burner-Furnace Unit)—85% of A.G.A. output rating.

Oil-Fired (Fan-Burner-Furnace Unit)—85% of the output rating as determined by the "Recommended Code of the N.W.A.H.&A.C.A. for Testing and Rating Oil-Fired, Fan-Furnace Combinations."

Stoker-Fired (Fan-Burner-Furnace Unit)—85% of manufacturer's certified output rating at 70% or greater bonnet efficiency.

5156—*Boiler*

(Only for heating systems serving two or more dwelling units or for extensions of existing plants to service additional living accommodations).

Gas-Fired—65% of A.G.A. output rating.

Hand-Fired or Mechanically - Fired (All Fuels)—100% of current I-B-R net rating for cast iron boilers, or 100% of net rating certified by the manufacturer to have been obtained by test procedure in accordance with the I-B-R Testing and Rating Code less (in each case) 12,000 net Btu per dwelling unit for domestic hot water heated indirectly by the heating boiler.

516—*Limitation on Gas-Fired Equipment*

The use of gas fired equipment for heating space is subject to the availability of natural or mixed natural and manufactured gas from the Utility Company servicing the project. In addition, in areas where prohibitions or restrictions on deliveries of such gas for gas-fired equipment for heating space are imposed by the War Production Board, proof must be submitted establishing exemptions from such prohibitions restrictions.

## PERMISSIBLE INSTALLATIONS

520—*Overflow Heaters*

521—Floor Furnaces and pipeless gravity furnaces—ferrous metal—no metallic coating.

5211—Registers—stamped, fabricated or cast ferrous metal—no metallic coating.

522—Space heaters, stoves and other similar heating devices—ferrous metal—no metallic coating.

530—*Warm Air Distribution Systems*

531—Furnaces—ferrous metal—no metallic coating.

5311—Fans, blowers and motors—for forced warm air systems.

5312—Filters—for forced warm air systems—non-metallic containers and filter material with ferrous metal grid.

5313—Humidifiers—including parts and piping non-metallic or ferrous metal—non-metallic coated except for optional zinc coated piping.

532—*Distribution Materials:*

5321—Ducts, connection, fittings, hangers, and fastenings—

(a) Ferrous sheet metal, untreated or phosphate treated.

(b) Zinc coated ferrous sheet metal fittings for concealed composition duct work.

5322—Limitations—Eligible materials and quantities limited to those necessary to meet the minimum sheet metal requirements of the current standards of the National Board of Fire Underwriters, Pamphlet No. 90. The following are not eligible: Sheet metal double ducts; sheet metal return

ducts beyond 6 feet from the heater; sheet metal heavier than 26 U. S. gauge.

5323—Registers and grilles.

(a) Stamped, fabricated or cast ferrous metal—no metallic coating.

#### 540—*Steam or Hot Water Systems*

(Only for heating systems serving two or more families or for extensions of existing plants to service additional living accommodations).

541—Boilers—ferrous metal with brass safety devices and cocks limited to minimum practicable and with pressure gauges for steam boilers and combination temperature and altitude gauges for hot water boilers.

Metal jackets not allowed.

#### 550—*Firing Equipment*

551—Oil and Gas burners.

552—Coal stokers, hopper type—for multi-family systems only. No metallic coating.

553—Oil storage tanks—ferrous metal, no metallic coating, size not to exceed 275 gallons capacity for tanks serving three units or less and to not more than 100 gallons per dwelling unit for tanks serving four dwelling units or more.

554—Oil line pumps.

555—Vent, fill and oil line piping and fittings—ferrous metal, no metallic coating.

#### 560—*Control Equipment*

561—Electric material as allowed under 330, 340, 350, 360, and 370 of Electrical Section.

562—Relays and solenoids.

563—Damper Regulators.

564—Thermostats (Room, aquastats, air stats, combination fan and limit controls, combustion safety controls.)

565—Pressure controls.

5651—Pressure reducing valves.

5652—Pressure stats.

5653—Pressure relief valves.

566—Shut-off cocks for gas heaters, furnaces and boilers.

#### 570—*Breechings and Smokepipe*

Ferrous metal, no metallic coating.

Breechings for multi-family heating systems may include necessary cleanout doors.

#### 580—*Vents and Flues*

For heating equipment in demountable houses—ferrous metal, no metallic coating. Vents may include necessary casings, supports and connections. "Demountable houses" may include all prefabricated structural enclosures for dwelling purposes.

## WPB Limits Use of Natural Gas

THE War Production Board on February 16 ordered a curtailment in the consumption of natural gas and mixed natural and manufactured gas.

Parts of the order (L-31) apply to the entire country. They do not become operative until a gas shortage occurs or becomes imminent in any area.

Other parts of the order apply only to 17 States and the District of Columbia, where the need for curtailment is greatest. They became effective on March 1 but do not affect present uses of existing customers. That is, a consumer now using gas to cook or heat water is not restricted in such uses but he may not install a gas heating system in his home, store, or factory, or convert heating equipment now using other fuel to gas.

The order affects companies distributing natural gas or natural gas mixed with manufactured or artificial gas. It does not affect companies distributing only manufactured gas.

### New Consumption Forbidden

Gas companies operating in 17 States and the District of Columbia are ordered as follows:

1. They are prohibited from delivering gas for heating new homes, stores, factories, or other buildings, unless the heating equipment is installed prior to March 1, 1942, or the equipment was specified in the construction contract and the foundation under the main part of the building is completed prior to March 1. This applies to a heating system intended to furnish all or the major part of the heat for a home or building. It does not apply to individual room heaters.

2. They are prohibited from delivering gas for the operation of heating equipment that has been converted from some other fuel to gas, unless such conversion is completed within 10 days after the issuance of the order.

Any utility or any governmental agency (such as a housing company) affected by this prohibition against new and converted installations, which considers that the available gas supply is adequate for all existing and estimated future war requirements as well as unrestricted civilian use until April 1, 1944, may apply to the Director of Industry Operations for exemption from this provision.

3. They are prohibited from delivering gas to any new nonresidential consumer or increasing delivery to any existing nonresidential consumer, unless: (a) such new or existing consumer has installed standby facilities sufficient to replace the new or increased delivery during periods of shutoff; or (b) such new or existing consumer cannot reasonably use any fuel other than gas; or (c) approval shall have been granted in advance by the Director of Industry Operations for delivery to such new or existing consumer. This provision becomes effective 10 days after the issuance of the order.

The areas subject to the prohibitions just listed are:

Alabama (except the area served by the United Gas Pipe Line Co.), Arkansas (only the area served by the Mississippi River Fuel Co.), California, District of Columbia, Georgia, Illinois, Indiana, Kentucky, Maryland, Michigan, Mississippi (except the area served by the United Gas Pipe Line Co.), Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia.

# Price Ceiling On Fuel Oil Tanks

Maximum prices for domestic fuel oil storage tanks were established by Price Schedule No. 96, which became effective on February 20, 1942.

Ceiling prices apply to all sales of tanks in which the seller does not install the tank by connecting it with an oil burner.

Maximum prices for tanks delivered in the East are delivered prices and include lugs. Prices for tanks delivered in the Mid West and Far West are f. o. b. factory prices, and in the Far West include lugs.

The schedule requires every manufacturer to affix to tanks produced by him durable labels setting forth the name of the manufacturer, the size and capacity of the tank and the gauge of steel used. These labels will enable purchasers to compute the maximum prices applicable to all tanks.

Excerpts from the schedule follow—

## TITLE 32—NATIONAL DEFENSE CHAPTER XI—OFFICE OF PRICE ADMINISTRATION PART 1330—CONTAINERS PRICE SCHEDULE No. 96—DOMESTIC FUEL OIL STORAGE TANKS

**1330.101 Maximum Prices for Fuel Oil Storage Tanks.** On and after February 20, 1942, regardless of the terms of any contract of sale or purchase, or other commitment, no person shall sell, offer to sell, deliver, or transfer any domestic fuel oil storage tanks, other than on an installed basis, at prices higher than the maximum prices set forth in Table 1 shown herewith.

**1330.102 Less than Maximum Prices.** Lower prices than those set forth in Appendices A, B, and C may be charged, demanded, paid, or offered.\* (Table 1)

**1330.103 Evasion.** The price limitations set forth in this Schedule shall not be evaded whether by direct or indirect methods in connection with a purchase, sale, delivery, or transfer of domestic fuel oil storage tanks, alone or in conjunction with any other material; or by way of any commission, service, transportation or other charge or by a tying-agreement or other trade understanding or by making terms and conditions of sales more onerous to the purchaser than those available or in effect on January 15, 1942 or by unreasonably refusing to ship in carload quantities when available; or by excessive charges for tank accessories; or by any other means.

**1330.105 Records and Reports.** (a) Every person making purchases or sales, other than on an installed basis, of domestic fuel oil storage tanks of a value of more than \$100.00 during any calendar month after January 1942, shall keep for inspection by the Office of Price Administration for a period of not less than one year complete and accurate records of (1) each such purchase or sale, showing (i) the date thereof, (ii) the name and address of the buyer and the seller, (iii) the point of delivery of the tank to the buyer, (iv) the price paid or received for the tank (exclusive of accessories other than lugs, (v) the freight paid by the seller and charged to the buyer where the tank is delivered to the buyer within the Midwestern Area, (vi) the gauge of steel used in the tank, (vii) whether the tank was sold with or without lugs, (viii) the capacity of the tank in gallons, (ix) the size of the tank in inches, and (x) the quantity of each type of tank purchased or sold, and (2) the quantity of domestic fuel oil storage tanks (i) on hand, and (ii) on order, as of the close of each calendar month.

(b) Every person required by the above paragraph to keep records who purchases or sells tank accessories in conjunction with the transfer of a tank shall likewise keep records showing the details of the tank transfer of which the transfer of accessories is a part, the prices paid or received for the accessories, and type and quantity of each such accessory purchased or sold.

(c) Persons affected by this Schedule shall submit such reports to the Office of Price Administration as it may from time to time require.

**1330.107 Modification of the Schedule.** Persons complaining of hardship or inequity in the operation of this Schedule may apply to the Office of Price Administration for approval of any modification thereof or exception therefrom: **Provided,** That no applications under this section will be considered unless filed by persons complying with this Schedule.

**1330.108 Definitions.** When used in this Schedule, the term

(a) "person" means an individual, partnership, association, corporation, or other business entity. The term includes, without restricting the generality of the foregoing, any manufacturer commission salesman, wholesaler, jobber, or dealer.

(b) "domestic fuel oil storage tanks" means obround basement type steel tanks of the gauges of steel, capaci-

Table 1—Price Schedule

Nominal Tank Capacity in Gallons	Gauge of Steel in Wrapper Sheet	Car or Truckload Quantities	Less than Car or Truckload Quantities	Car or Truckload Quantities	Less than Car or Truckload Quantities	Car or Truckload Quantities	Less than Car or Truckload Quantities
		Eastern Area	Midwestern Area	Pacific Coast			
275	14	\$17.35	\$18.75	\$17.70	\$19.75	\$31.95	\$35.50
275	14	17.75	19.15	18.05	20.15	32.35	35.90
250	14	17.00	18.40	17.30	19.40	31.55	35.10
250	14	17.35	18.75	17.70	19.75	31.95	35.50
220	14	16.60	18.00	16.90	19.00	31.20	34.75
220	14	17.00	18.40	17.30	19.40	31.55	35.10
200	14	16.20	17.60	16.50	18.60	30.81	34.35
200	14	16.60	18.00	16.90	19.00	31.20	34.75
275	12	19.50	21.10	19.85	22.15	34.10	37.55
275	12	20.15	21.70	20.45	22.80	34.75	38.15
250	12	18.90	20.50	19.25	21.55	33.50	36.90
250	12	19.50	21.10	19.85	22.15	34.10	37.55
220	12	18.30	19.85	18.60	20.95	32.90	36.30
220	12	18.90	20.50	19.25	21.55	33.50	36.90
200	12	17.65	19.25	18.00	20.30	32.25	35.65
200	12	18.30	19.85	18.60	20.95	32.90	36.30

Maximum allowance for each extra transverse seams 75c.  
No allowance for extra longitudinal seams.

ties and sizes listed in the applicable Appendix of this Schedule.

(c) "f. o. b. factory price" means a price including all commissions but excluding all freight and delivery charges.

(d) "delivered price" means a price including all commissions and freight and delivery charges to the location designated by the purchaser.

(e) "carload quantity" means a shipment of domestic fuel oil storage tanks which is to be moved by rail, the aggregate weight of which totals at least the lowest applicable minimum carload weight as specified in the established tariff of the rail carrier involved, or for which a carload rate would be paid.

(f) "truckload quantity", when shipment is by common or contract carrier by motor, means a shipment of domestic fuel oil storage tanks, the aggregate weight of which totals the applicable minimum truckload weight as specified in the established tariff of the common or contract carrier by motor involved, which minimum weight is closest to the carload weight referred to in (e) above for a comparable movement. In all other cases the "truckload quantity" means 18 or more domestic fuel oil storage tanks, shipped by truck.

(g) "installed basis", when used in reference to a sale or delivery, means a transaction in which the seller furnishes a domestic fuel oil storage tank and, in consideration of the total price paid by the purchaser, performs the service of connecting the tank to an oil burner.



# Defense Developments

## Oil Burning Equipment Order

As rumored a proposed order controlling the sale of oil burning equipment has been under consideration for quite a number of weeks in Washington. Washington on 3/2/42 says that the order has not yet been issued. It is rumored the proposed order will prohibit the sale of oil fired equipment in eleven eastern states in addition to the states of Washington and Oregon.

## Warm Air Heating Experts Needed by Army

Mechanics, supervisors and other maintenance and repair men experienced in the operation and repair of warm air heating systems are needed throughout the Army, the War Department announces. Widespread use of this type of heating, especially in the larger camps and cantonments, calls for a large number of men to keep the plants in operation.

Experienced and qualified men interested in obtaining such employment should apply in writing, stating age, address and past experience. The applicant should address the District Engineer nearest or most convenient to his place of residence.

Applications may be made to the U. S. Engineers at the following addresses:

Boston District, 31 St. James Avenue, Boston, Mass.  
New York District, 120 Wall Street, New York, N. Y.  
Baltimore District, 332 P. O. Building, Baltimore, Md.

Atlanta District, 494 Spring St., N. W., Atlanta, Ga.  
Columbus District, 232 North High Street, Columbus, Ohio

Chicago District, 932 New P. O. Building, Chicago, Ill.

Omaha District, 1709 Jackson Street, Omaha, Nebraska

San Antonio District, Fort Sam Houston, Texas  
Salt Lake City District, 32 Exchange Place, Salt Lake City, Utah.

## Who is a Manufacturer Under PD-25A

AS the first quarter of 1942 approaches its close about 4,000 manufacturers have filed under the Production Requirements Plan; of this number more than 75 per cent are now operating under it. One particular question about the Plan asked repeatedly is:

What type of processing will qualify one as a manufacturer under the Production Requirements Plan?

WPB holds that any person who purchases raw materials, such as copper, brass, lead, etc., and fabricates these into any other form is a manufacturer, and, therefore, eligible to qualify under the Plan. There is, however, some belief on the part of prospective applicants under the Production Requirements Plan that, if they merely purchase finished parts for further assembly, they are not eligible. This is untrue. The WPB recognizes as a manufacturer any concern who either by virtue of actual fabrication or assembly creates any new product.

There are many "manufacturers" whose business

consists of purchasing finished goods from one or more sources in the form they wish to resell, and who do not in any way alter the form of the materials they buy. It should be clearly understood that these concerns are not eligible for operation under the Plan, because they are, in effect, not manufacturers. They are distributors.

It should also be explained that a manufacturer who, in addition to actual fabrication on his own part, purchases finished materials from other manufacturers, to be sold along with his own product, may seek priority assistance under the Plan for those materials which he purchases in a finished form. For example, if a manufacturer of furnace normally sells smoke pipe, ducts, and registers, along with his unit, he may properly request priority assistance on all of the named materials, because he is not "jobbing" the items, but marketing them as a finished unit.

## Chlorinated Cleaning Solvents Scarce

FABRICATORS of metals are warned by the Chemicals Branch, War Production Board, to investigate every possible cleaning method other than chlorinated solvents applicable to their operations.

A shortage in chlorinated solvents already exists, caused by the vast increase in metal fabricating and the situation will get worse, instead of better, as time goes on. Manufacturers with war contracts will be affected as well as others, and continued extension of the use of chlorinated solvents will not be possible.

At least 30 per cent of the cleaning operations in the metals industry now being done with chlorinated solvents can be accomplished by the use of other materials, such as mineral spirits, non-chlorinated-solvent-water emulsions and alkalis. It is imperative, the Branch warns, that every possible cleaning method be investigated promptly so that necessary changes in method can be accomplished without serious delay in production.

## 1941 New House Construction

URBAN home financing in the United States during 1941 amounted to nearly five billion dollars—17 per cent above 1940 and exceeding the 1939 total by 35 per cent—economists of the Federal Home Loan Bank Board reported Feb. 7.

Savings and loan association maintained their lead over all types of mortgage lenders during the year by accounting for more than 31 per cent of the \$4,700,000,000 recordings of \$20,000 or less. Banks and trust companies were second with approximately 25 per cent of the total, while individual lenders were third with about 17 per cent.

Increasingly affected by material shortages as existing inventories declined, new residential construction during December registered a drop of 32 per cent from the level of December, 1940, and 44 per cent from the peak of June, 1941. December was the sixth successive month the volume of new housing has declined, and the seasonally adjusted index stood at

133 per cent of the average 1935-1939 period, the base taken by the Bank Board's Division of Research and Statistics as 100.

Figures reported by the U. S. Department of Labor show that building permits were issued during December for 16,324 privately financed dwelling units, a reduction of 8,100 from November. One- and two-family type of house construction sustained the least decrease, 17 per cent, and apartment houses the greatest, 71 per cent. During November this tendency was exactly the opposite. Housing provided by government funds registered a decline of 36 per cent during December.

Construction costs of a standard six-room house rose 11 per cent during 1941 and on December 31 were nearly 20 per cent above the average month of 1935-1939. Building material costs increased 11.1 per cent during the year, and the cost of labor rose 10.4 per cent.

While labor costs increased more than material costs during the first 10 months of 1941, prices for materials rose sufficiently during November and December to bring their percentage increase for the year above that of labor. Labor costs, however, showed an increase of 24 per cent above the average for the 1935-1939 period, used by the Bank Board's Research and Statistics Division as a cost index of 100. Material costs have risen 18 per cent on this index.

## Jobbers & Distributors in WPB

"Gentlemen:

A Section of Distribution has recently been established within the Production Requirements Branch of the War Production Board.

It is the purpose of this Distributor Section to give Distributors of all kinds of Hard Goods of which the attached list is representative, their proper place in the Defense Program and to coordinate and correlate their activities with those of the manufacturers whose products they distribute."

Linford C. White, Chief, Distributors' Section  
Production Requirements Branch War Production Board, Washington, D. C.

## 10 New Housing Critical Areas Added

MARFA, Tex., Lancaster, Calif., and Hurley-Santa Rita, N. Mex., have been added to the Defense Housing Critical Areas List.

Seven other new communities were added to the Defense Housing Critical Areas List February 19.

Priority assistance in the erection of privately financed dwellings for defense plant workers is now available in Sturgeon Bay, Wis., Orangeburg, S. C., Americus, Ga., Taft, Calif., Chico, Calif., Miami, Okla., and Port Angeles, Wash.

## High As We Go - 2 Stories

UNDER a new policy for Defense Public Works projects buildings will be limited to one and two-story masonry and one-story wooden structures. These limitations apply to schools, hospitals, firehouses, and virtually all other types of buildings provided under the program; not only those to be ap-

proved in the future, but also those which have been approved already but for which contracts have not yet been let. Wood will be used where the need appears to be purely temporary, except that masonry will be recommended in all areas subject to enemy action.

Specifications have been worked out for a basic masonry unit with concrete foundation and floor, which is set over a gravel fill. Sixteen-inch concrete pillars will support a concrete roof. The walls may be of concrete, cinder block or brick. Windows will be of wood, set flush with the outside of the wall.

These masonry structures will be fireproof and bomb-resistant. In the two-story buildings, concrete stairs or ramps will connect the floors as required. These will not be wall-bearing structures.

Similar specifications have been worked out for two types of wooden structures, one purely temporary and the other fire-resistant and more permanent.

Auditorium-gymnasiums required for schools will be built of wood and connected to the basic masonry buildings by covered passageways.

## Theatre of Operations Camps

THE current camp building program covering plans and specifications made some time ago will use a substantial volume of coal and some gas-fired, where permitted, and possibly oil-fired forced warm air heating equipment in barracks. However, in the new Theatre of Operations, 15,000 men, Triangular Camps, all of the buildings with the possible exception of hospitals will according to present plans use 16-inch grate diameter government standardized specifications, Cannon Stoves.

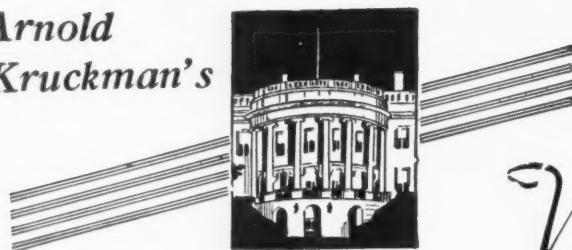
Members of the Research Advisory Committee of the NWAH&AC Assn. have been making an effort to have the specifications changed from Cannon stoves to barracks heaters and failing in that, an effort to permit quotations on barracks heaters as an alternate.

Barracks heaters, mounted on a base about six inches above the floor without casings and fronts, have been furnished in sizes from 18-inch to 30-inch or more in cast iron or steel. Tens of thousands were sold during the world war. About 15,000 barracks heaters of various makes were sold to the Government in 1935 for Civilian Conservation Corps Camps.

There will be a large but undisclosed number of Theatre of Operations camps built. Barracks will be 100 feet long by 20 feet wide—one floor and will accommodate about 34 men. If the specifications can be changed from Cannon stoves to barracks heaters it will mean a substantial addition to our industry's business in the critical year of 1942.

## Warm Air Blowers Exempted From Fan Price Order

LEON HENDERSON'S letter of February 12 requested manufacturers not to sell or deliver "standard industrial fans and blowers or component parts," at a net price in excess of prices in effect October 1, 1941. On the important point, "What was meant by standard industrial fans, etc." Office of Price Administration says that the February 12th letter covers all fans and blowers with the exception of those used in connection with warm air furnaces.



## Washington Letter

### Prime Contracts and Sub-contracts Up-to-Date

AS THIS letter is being written the battle for production is by no means solved—many complex problems must still be met—but the outline of the problem and its solution are now sufficiently clear to permit discussion, and discussion about it is essential if you want to understand why you have so much trouble in settling down to the war jobs you know you can do.

This battle for production started when we went into the war emergency, almost two years ago. In all good faith the Army and Navy had been formulating their plans for production upon the basis of the facilities of a number of the larger industries of the nation. The members of Army Industrial College, including Naval officers and Coast Guard officers, had been trained at the plants of these large industries. The experimental orders, officially called Educational Orders, for which Congress provided millions, had been allocated to these plants. The whole war economy was geared theoretically to large facilities.

If the need of the emergency had fitted the original program the plan would have been entirely workable and would have produced smoothly. But no one had foreseen that we would have to provide 36 or more nations with everything they need to fight and to live. It left us with part of our economy reasonably well prepared for war, but with the vast reservoir of smaller business units unprepared to produce for war.

#### Small Industry is Our Untapped Reservoir

Collectively this small industry reservoir has far more resources for production, but many of the units lack the precision apparatus and training essential for war production. It was very natural, therefore, for the armed services to turn to the big units for war products and it was natural the armed services should repeatedly give fresh orders to the units in which they had been trained to have confidence. The backlog of orders that piled up was a consistent phenomenon. These orders naturally were given out directly by the Procurement agencies of the armed services. They had been accustomed to assume that untrained small business would not be able to handle war production efficiently.

This, and other factors, inevitably lead to a lopsided industrial situation which created bottle necks. Long ago, earlier workers in the war agencies, tried to unfreeze orders that should be spread widely as subcontracts among smaller business units. But the very sincere reluctance of the armed services to experiment with untried facilities through civilian agencies caused a lag. And it was very natural for the industrial groups that possessed the orders to

oppose the efforts to take them away.

All this, together with a very definite lack of confidence among the smaller business element, brought about the Odlum experiment. When this also failed, to a large extent on account of lack of concentrated authority, Donald Nelson was created over-all head of war production. Nelson, largely said to have been chosen by the influence of Sidney Weinberg, and the admiration of Winston Churchill and Lord Beaverbrook, has the stupendous personal vigor necessary for the job, and has the intelligence, practical experience, and tact absolutely essential. It remained to find out whether or not he had the tough courage to dominate the independent tendencies of the officers of the armed services. The showdown came over priorities for airplanes. The armed services held that airplanes should be second to other needs, chiefly, it is said, naval vessels and merchant ships. By the time the issue had come to a head, Nelson had become one of the Big Four, the inner council, said to be the equivalent of the British War Council. This naturally is headed by the President and consists, also, of Harry Hopkins, Leon Henderson, and Nelson. Under the President, each man represents the major components of war efforts; Hopkins, lend-lease and the confidence of Mr. Roosevelt; Henderson, Price-Control and civilian economic controls; Nelson, war production. Nelson, undoubtedly with the full knowledge and approval of his associates, took the step that served notice on the armed services that he is the supreme authority in war production. He personally issued the order which gave airplanes priority preference second to none.

#### Whole Industries to Be Converted

The next problem, now in the process of solution, is Conversion. Nelson will transform to war work every facility in the United States that can be made useful. Thus far conversion has been slow. A few weeks ago Nelson said the percentage was so insignificant that it was scarcely worth mentioning. Nelson very honestly and sincerely holds it is none of his business to put up safeguards for the protection and preservation of small business that cannot convert. He holds it his business to secure conversion, even if conversion kills some businesses.

On the other hand, Congress, prodded by small business, and stirred by the political appeal, insists something should be done to save the small business that cannot convert. *There is the current tug of war.*

Naturally, so long as there is a tug of war, there is delay and all those who hold shades of opinion

*(Continued on page 102)*



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AMERICAN ARTISAN

# RESIDENTIAL AIR CONDITIONING

S E C T I O N



DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING



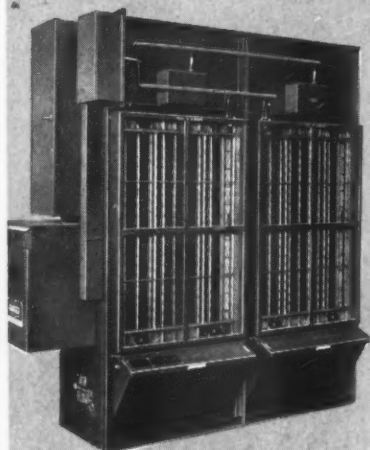
# EFFECTIVE DUST CONTROL

## KEEPS PRODUCTION LINES MOVING

### *Faster*

AAF

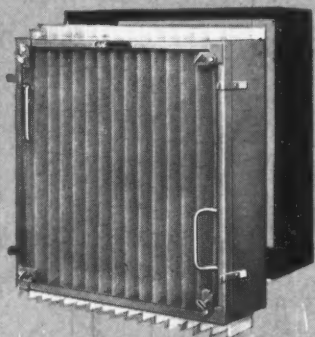
AAF



**ELECTRO-MATIC** air filter combines electrical precipitation with automatic air circulation to obtain highest efficiency in removal of atmospheric dust, smoke, oil and welding fumes. Bulletin 250C.



**AMERICAN AUTOMATIC** self cleaning filter is ideal for most large ventilating and air conditioning installations. Provides multi-stage air cleaning by means of a media of graduated density. Bulletin 241.

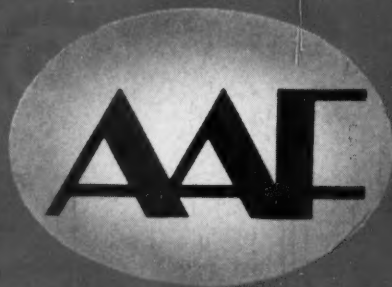


**AMAT TYPE PL** dry filter is designed for ventilating and air conditioning service where dust concentration is not abnormal. Its advantages of high cleaning efficiency, low initial resistance, and large holding capacity make it applicable to more types of air cleaning service than other filter. Bulletin 230B.

Vastly accelerated delivery schedules in all types of industries, especially those directly engaged in war production, have brought the problem of clean air to the forefront in production planning. Industry in the war emergency can no longer afford the delay and loss which dust imposes on the nation's productive capacity. Men who operate machines must breathe freely of clean wholesome air, and those machines must be protected from the ravages of dust that deteriorates the best of equipment or breaks down accurately finished surfaces. So, today more than ever, clean air is recognized as an industrial necessity.

Practically every new defense plant has been supplied with AAF air filtration and dust control equipment and hundreds of additional installations have also been made in existing plants whose facilities are required for war materials production. The American Air Filter Company is operating 16 to 24 hours a day in order to meet industry's air filtration and dust control needs.

Write for "AAF In Industry" and bulletins describing the complete line of American Air Filters for atmospheric dust control. Address 354 Central Ave., Louisville, Kentucky.

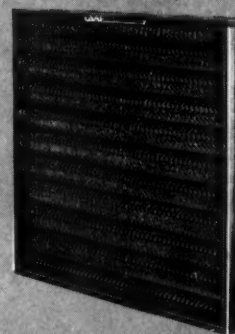


**AMERICAN AIR FILTER CO., INC.**

INCORPORATED

**LOUISVILLE, KENTUCKY**

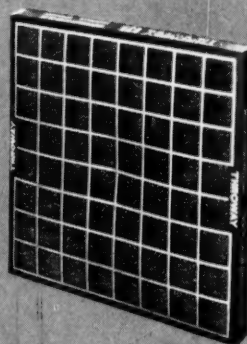
IN CANADA: DARLING BROS. LTD., MONTREAL, P. Q.



**THROWAWAY**, as the name implies, is designed to be discarded after it has collected its full dust load and replaced with a complete new unit. Low first cost and simple maintenance makes it particularly applicable to warm air heating or domestic air conditioning systems where cost of replacement due to small number of units required does not represent a large item of expense. Bulletin No. 117E.



**TYPE G DRIFILTER** is an inexpensive, replaceable filter in which bonded fibrous glass material that has proved so satisfactory in Airmat filters is used as a filtering medium. Its outstanding advantages in addition to being odorless, flame-proof and cleanable are its high efficiency in dust removal and low resistance to air flow. Bulletin No. 57.



**A/C WASHABLE FILTER** is a permanent type filter having high cleaning efficiency and greater dust storage than the Throwaway or similar types of renewable filters. Can be cleaned and re-used at a cost of 5c. Bulletin No. 77.

# *Twin City Furnace Co., Minneapolis, in 1941, Sold* **\$165,000 Gross Volume of Furnace Work** **\$125,000 in New Houses** **\$88,000 From Pricing Books Given Builders**

FROM the sale and installation in Minneapolis, and nearby suburbs of gravity and mechanical warm air furnaces in new houses; from the repair, remodeling, reconditioning of existing warm air furnace systems; from the sale of new furnaces in old houses; from the sale of oil burners and gas conversion burners—Twin City Furnace Company, Minneapolis, recorded an approximate gross volume of \$165,000 in 1941.

This sales volume is not achieved haphazardly—it is the result of a carefully planned sales program coupled with a close cost and operating control over every phase of the business. The two factors cannot be separated—indeed, such a large sales volume without the accompanying complete operating control would be suicidal in the highly competitive Twin City market where scores of furnace installers actively solicitate every possible sale.

The business is organized around a well-defined pattern—first, the intention to get as large a share of the furnace installations in new houses as possible; second, to control the total sales volume with as much old house work as the organiza-

tion can handle; and, third, to use every possible scheme to produce jobs at the lowest possible price while sustaining quality.

But there must be a profit in every operation and this profit must be indisputable bookkeeping balance.

## **New House Installations**

Installations of heating systems in new houses during 1941 constituted approximately four-fifths of Twin City's total sales volume. Perhaps the most interesting single feature of this sale of about \$125,000 gross volume is the method of selling new house builders.

J. E. Waldron, manager of the company, personally sells about 70 percent of the new house volume. And he does it through a most unusual plan which is unique because it is so simple. The plan had its inception several years ago when Mr. Waldron realized that of all the new house builders in the Minneapolis area, a relatively few built most of the houses; these builders erected houses in large groups; their credit and record for payment was very good; once they found a



Left—J. E. Waldron, Manager, with his book of 20,000 old customers' names and addresses. Every one of these is actively and continuously solicited. Right—General view of office looking toward the shop. Bookkeeping, management, engineering all center here.





Left—Mechanic Rudy Walberg making up a standard 4-foot length of stack ( $3\frac{1}{2} \times 10$  or  $3\frac{1}{2} \times 12$ ) for stock. Right—Shop superintendent Bruce Peterson checking the 10 standard fittings which take care of 95 per cent of all installations. Text explains what these fittings are.

general plan and type of construction which attracted buyers they stuck pretty close to that plan—with variations—which simplified pricing; and once convinced that the heating man offered the best in equipment, construction, planning, engineering—at fair prices—they disliked to switch to untried installers.

So Mr. Waldron formed a club. A simple organization which meets perhaps twice a year at a steak luncheon. No officers, no speeches, no program—but with one purpose—to establish a price schedule for the coming period.

At each meeting each builder is given a price book in which is listed the selling price of each furnace, the price of each piece of accessory equipment and, most important of all, a price per opening for duct work. This price per opening usually holds for about six months—should conditions change unexpectedly a new meeting is held and another price is established. This price per opening is not the lowest price available—neither is it the highest prevailing—but it is a fair price which permits the quality of workmanship wanted by the builder plus a fair profit for Twin City Furnace Company.

The builder takes his book and without calling for a Twin City salesman or engineer he can price his own job. Each furnace is marked for the cubic capacity it will heat if the builder follows his customary construction. Each price per opening covers the duct work. Twin City profit is included in the material, equipment and duct prices. This method requires that each builder be given his own book, priced according to the type of house he builds.

The interesting thing which then happens is that the postman brings in a set of blue prints with an order for a certain size and type of heating system. The postman frequently is the first knowledge Twin City has that a house is going up.

The other 30 per cent of new house volume is brought in by the firm's salesmen. This 30 per

cent of volume is made up of individuals building their own homes employing an architect and a general contractor; also small builders who put up a few houses each year; also architects who supervise house construction, and miscellaneous construction. Prices for a furnace and for duct work, is generally slightly higher to these buyers than similar prices for the big builder.

#### Cost Control and Management

One of the factors contributing to the firm's success undoubtedly has been the complete control over costs instituted by Mr. Waldron when he joined the company in 1922. Under this plan a record of every cost operation is carefully entered in the complete cost system—the result is that when a job is completed and billed there is a full cost record of every piece of material or every hour of labor required.

A number of records are used for this control. Under this plan the shop produces stock items and specials at a basic shop labor rate to which an allotted overhead it added. The Shop then sells to Sales each item of duct work at a predetermined cost. The office, on most items, pays 10 per cent above shop cost. It was not intended that the shop should show a large profit, but in 1940 the shop showed a net profit of more than \$1,500.

A suitable form is provided on which the shop enters each item at the shop cost plus overhead as the item is taken out of stock for a job. Specials and shop labor required are shown on the same form. The bookkeeping department takes all the job material requisitions and makes a recapitulation sheet which shows materials, also labor for shop operations. On the same sheet is shown all field costs for labor and the miscellaneous items such as building paper, lath, cement, sand, asbestos paper, paste, etc. When the job is finished this recap sheet gives a complete cost record of the job.



### HEATING PERMIT

Building Department  
ST. LOUIS PARK, MINN.

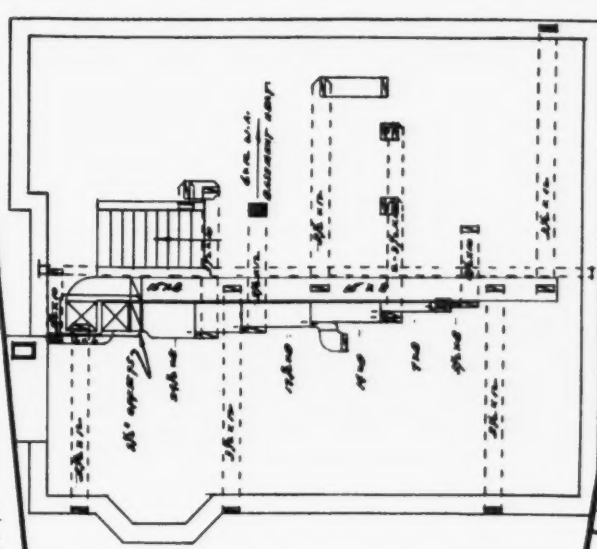
No. 628

Owner: *A. J. Sanger*  
 Location: *13 South Third Street*  
 Kind of Building: *House*  
 To be used as: *Res.*  
 Work Commenced: *Oct 1*  
 Work Completed: *Oct 1*  
 Estimate Cost: *\$10*  
 Building Permit No. *4160*

Installation of:  
 Steam: ☒ Hot Water: ☒ Gravity: ☒  
 Forced Air: ☒ Air Conditioning: ☒ Repaired: ☒  
 To be installed: *None*  
 Make: *Lennox*  
 Connected Load: *60864*  
 Horsepower: *None*  
 Gas Burner: ☒ Oil Burner: ☒ Stoker: ☒  
 Hand Fired: ☒  
 Any Other Device: *None*  
 Capacity: *None*  
 Remarks: *None*

Permission is hereby granted to *A. J. Sanger* to do above described work in accordance with the Ordinance of the Village of St. Louis Park, the above description of the proposed work being the same as set forth in the application, to which his name is attached.

Granted the *9* day of *Oct* 194*1*  
 Final Inspection: *None*  
 Building Inspector: *None*  
 Deputy: *None*



### TWIN CITY FURNACE & APPLIANCE CO.

LENNOX AIR-FLO AIR CONDITIONING SYSTEMS  
 TORRINO ZONE STEEL FURNACES  
 ONE BUSINESS - ONE RES.

LARGEST STOCK OF REPAIRS IN THE NORTHWEST  
 13 SOUTH THIRD STREET, ST. LOUIS PARK, MINN.

PHONE NO. *2-1111*  
 ESTIMATES GIVEN TO *A. J. Sanger*  
 ADDRESS *13 South Third Street*  
 FOR BUILDING AT *13 South Third Street*

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

*Completely install one 25000 Btu/hr. Lennox Air-Flo Air Conditioning System - including one 25 gallon fuel tank - vacuum 1/2 g. existing registers - add two new cold air returns and two new warm air returns from 2nd floor*

QUOTED BY *None*

### HEAT LOSS CALCULATIONS

Construction No. *13 South Third Street*

Weathering	Area	U-Factor	Loss	Remarks
Walls	1000	0.10	100	
Windows	100	1.00	10	
Doors	100	1.00	10	
Roof	1000	0.10	100	
Floor	1000	0.10	100	
Basement	1000	0.10	100	
Attic	1000	0.10	100	
Unheated Space	1000	0.10	100	
Infiltration	1000	0.10	100	
Exhaust	1000	0.10	100	
Net Loss			1000	

### TIME RECORD FOR EACH JOB

No. 03528 Date *7-29-1941*

Name *A. J. Sanger*  
 LOCATION *13 South Third Street*

Cutting *2 1/2*  
 Repair Work *1 1/2*  
 Place Work *1 1/2*  
 Vacuum Cleaning *1 1/2*  
 Service *1 1/2*  
 Unheated Space *1 1/2*  
 Infiltration *1 1/2*  
 Exhaust *1 1/2*  
 Net Loss *1 1/2*

### PURCHASE ORDER

TWIN CITY FURNACE & APPLIANCE CO. No. 4206  
 13 S. 3rd St., Bridgeport 7573  
 MINNEAPOLIS, MINN.

Ship to *None*  
 Address *None*  
 Ship to *None*  
 Address *None*  
 Ship to *None*  
 Address *None*

### HEATING ENGINEER'S WEEKLY REPORT

TWIN CITY FURNACE CO.  
 MINNEAPOLIS - ST. PAUL

NAME	ADDRESS	TYPE	DATE	TOTAL	REMARKS
<i>J. N. Nor</i>	<i>4352-18th Ave. S.</i>	<i>Furnace</i>	<i>10/25/41</i>	<i>100</i>	<i>None</i>
<i>John Phillips</i>	<i>918-5th Ave. S.E.</i>	<i>Repair</i>	<i>10/25/41</i>	<i>100</i>	<i>None</i>
<i>R. D. Sanger</i>	<i>4001 First St.</i>	<i>Furnace</i>	<i>10/25/41</i>	<i>100</i>	<i>None</i>

### TWIN CITY FURNACE CO.

Division - Minneapolis, Minn.

The following is a representation of my earnings for the month, together with the earnings of my junior salesman, and I accept payment therefor in the following manner: Payment to junior salesman is to be made direct to him according to his report received by me.

T-1: 10% earnings for period *10/25/41*  
 Junior salesman's earnings: *None*

Balance: *None*  
 Product adjustment: *None*  
 Net balance due me: *100*

According to my signed commission agreement the net balance due me is to be paid as follows:

10% payable date (month) *11*  
 40% to be credited to my commission account as follows: *None*

*None*  
 Heating Engineer

### Purchase Order and Conditional Sales Contract

Order No. *AL 8938*  
 Purchaser's Name *None*  
 Address *None*  
 City *None*  
 State *None*  
 Zip *None*

TWIN CITY FURNACE & APPLIANCE CO.  
 13 South Third Street  
 Minneapolis, Minn.

By this agreement made to replicate this: *None*  
 TWIN CITY FURNACE & APPLIANCE CO. *None*  
 and *None*  
 Character Address *None*  
 together with its necessary fittings and parts, and to install same complete and ready for operation. The purchaser to furnish heretofore designed and approved equipment and a suitable chimney flue with proper smoke pipe opening. It is expressly understood that no planning work is to be done for the Company unless specifically written on this order.

DESCRIPTION: *1 - F.P. 81 - Lennox Oil Fired Heating Air Conditioner - completely installed to heat 2nd floor room for 250 gallon fuel tank*

SALES RE-CAP SHEET

### SALES CONTROL

Date *10/25/41*

Install to	Charge to	Address	Amount
<i>13 South Third Street</i>	<i>None</i>	<i>None</i>	<i>100</i>
<i>4352-18th Ave. S.</i>	<i>None</i>	<i>None</i>	<i>100</i>
<i>918-5th Ave. S.E.</i>	<i>None</i>	<i>None</i>	<i>100</i>
<i>4001 First St.</i>	<i>None</i>	<i>None</i>	<i>100</i>

### NET COST ON AIR CONDITIONING FITTINGS

Item	Qty	Unit Price	Total
<i>25000 Btu/hr. Furnace</i>	<i>1</i>	<i>100</i>	<i>100</i>
<i>25 gallon fuel tank</i>	<i>1</i>	<i>10</i>	<i>10</i>
<i>1/2 g. existing registers</i>	<i>2</i>	<i>5</i>	<i>10</i>
<i>2 new cold air returns</i>	<i>2</i>	<i>5</i>	<i>10</i>
<i>2 new warm air returns</i>	<i>2</i>	<i>5</i>	<i>10</i>

Labor on the job is carefully costed using time records for each workman individually. On this small ticket the workman indicates the hours per day worked; bookkeeping adds the wage rate and totals the labor cost. These time sheets are carefully kept as the job goes along and, at completion, are totalled up for the labor cost. If a workman works on more than one job during a day he fills in a ticket for each job.

A "Debit and Credit" form is also used to keep track of all items taken to the job, but not used and returned. This includes stock items, also special items and miscellaneous material (cement and paste, for example) which are so difficult to keep from wasting.

After the job is completed all these records, together with the office copy of the sales contract, the heat loss sheet and the plans are placed in a job file. A summary is attached showing the cost of material, cost of labor, the gross profit, the selling price and the net profit. A gain and loss item on this summary shows the profit expected and actual profit. This is used to guide sales in pricing jobs. Finally, all sub-contractors' bills and miscellaneous sheets are placed in the folder and the folder is filed as a record. These job folders are kept for several years.

#### New House Shop and Job Procedure

Once the order for a furnace in a new house gets into the Twin City office, a very definite and set procedure begins. This procedure is the same whether the order comes from a "catalog" builder or from an individual owner.

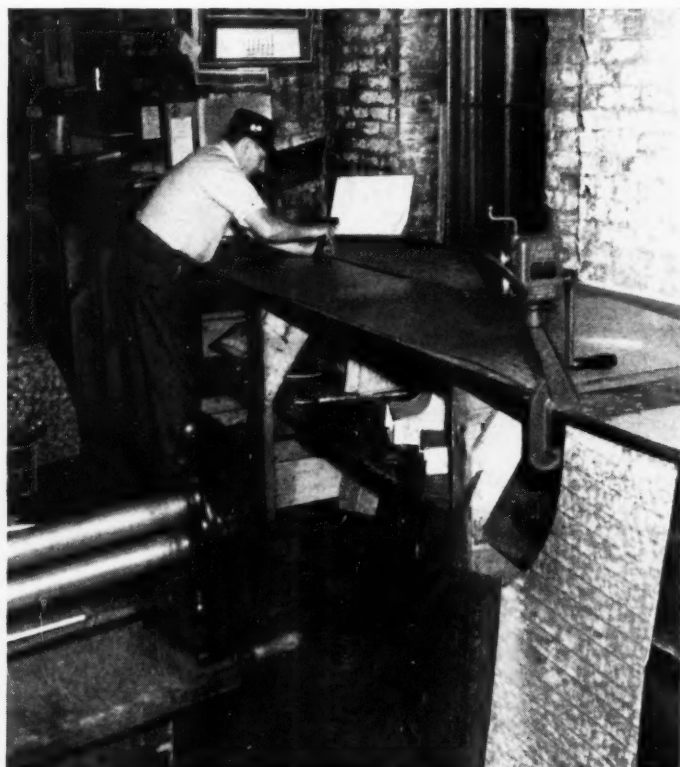
First an Estimate form is made out in dupli-

cate—one copy for the job salesman, the second for the owner or buyer. With the Estimate goes an Order made in triplicate—one copy for the salesman, one copy for the builder or buyer, one copy for the office. The job being sold, a Sales Control form is started—one copy—which is filed in the office. This lists the List Price, the Office Price and the Selling Price.

Next in order is a check on credit—if the buyer is unknown or has no credit standing with the firm. If credit is ok'd the job starts through the routine. A plan is taken off the building blue prints by the engineer—two copies; one for the office and one for the City Building Department. Two copies are made of the heat loss sheet for the same sources. At the same time a Heating Permit is taken out from the City Building Department.

Taking the blue prints and the plan and heat loss sheet, the engineer visits the job and lays out the work for the rough-in crew. Locations for holes and stacks are indicated on the plan and a list of materials is prepared for the rough-in crew. The rough-in crew takes the material shown on the list and roughs in the job. If changes from the plan are needed these changes are shown on the plan.

Next the superintendent visits the job and from the actual rough-in lays out the trunk lines and branches on the plan, checks the rough-in work and makes a list of stock fittings required for the work. The shop takes the plan and makes up all duct work not stock; makes up any special fittings. The duct work and furnace are delivered to the job and installation is made by an installa-



Left—Mechanic Adolph Enge puts flanges on top or bottom sheets of standard duct. Sides carry the Pittsburgh. Right—The layout prepared by engineering and broken into standard fittings or sections by the superintendent, is used to make any specials required.



tion crew.

Installation crews are composed usually of two men (the best obtainable) because Twin City takes pride in its installation work. This same crew usually sets the furnace, installs the plenum and the complete duct system. Registers and grilles are delivered with the piping and installed last.

Gas pipe connections and all electrical work are subcontracted to outside organizations. But Twin City has its own oil burner installer and service man and holds a Minneapolis license for oil burner work.

When the job is finished a final inspection is made by the engineer. If approved the job is entered in the routine billing procedure consisting of an Invoice of material and equipment. A final recap of material is made for office costing. After costing all records are filed for future reference or study.

#### Simplification and Standardization

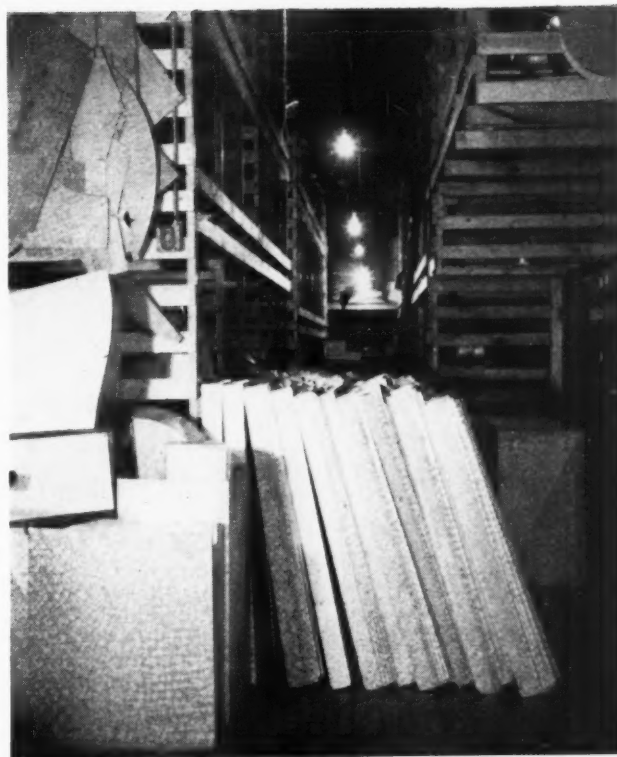
As stated, fittings are selected from stock when possible. This indicates that Twin City has standardized its engineering and duct work—and has simplified its sizes and types.

Some of the photographs illustrate this simplification. All mains are 8 inches deep and are built as one top and one bottom flanged to enter Pittsburgh locks which are made on two edges of each side sheet in the Pittsburgh machine. This standardization has been carried further. Mains are not sized to resistance all along the run—instead, the usual main decreases in size in multiples of  $3\frac{1}{2}$  inches at each takeoff along the run so that the resulting main is a combination of resistance—and velocity-sized pipe.

Two sizes of stacks and two sizes of registers are used wherever possible. Stacks are  $3\frac{1}{2}$  by 10 and  $3\frac{1}{2}$  by 12 and registers 10 by 6 and 12 by 6. Stack is made in 4-foot lengths to permit use in old as well as new houses. Of course, it is not possible to always use these sizes, but approximately 85 per cent of stacks and registers are these sizes.

Approximately ten fittings have been determined as common to most jobs, so these ten fittings (see photograph) are made up for stock all during the year and whenever outside work slacks off. The most used fittings are the  $3\frac{1}{2}$  by 10 and  $3\frac{1}{2}$  by 12 turn-up take-off and the 90-degree elbow which takes the branch off the main. The cheeks for this elbow are made in quantities of about 10,000 at a run in a foot press using a die. August, September, October quarter ordinarily is twice as busy a period as any other quarter so to meet this peak, fittings are made up during the summer, in large quantities, but at least one man and sometimes more work at production all year along.

In the usual job, the cold air run is designed like the warm air main run except that the return air branches that run between joists are cut into the top of the main. The return main is increased



Looking down the main aisle of the bins and racks in which standard fittings and sections are stored pending removal to fill a job order. Stock is built up in Spring and Summer and depleted in the fall.

in size at intervals in order to obtain proper air flow through the duct. Return grilles are usually placed in the baseboard and one return from each room except kitchen and bath is standard design. Registers are placed in the baseboard, usually, except bath, where registers are in the high side wall.

To reduce engineering time required, the coefficients used for standard types of wall, ceiling, floor, and glass, are all listed conveniently; but each house is figured exactly by the B. T. U. method.

All work is done in strict accordance with the Minneapolis City Code and each job is inspected thoroughly before it is approved. Ductwork is designed according to the medium velocity system with 750 f. p. m. in main ducts—550 f. p. m. in branches and stacks, and 350 f. p. m. at the register.

#### Old House Activity

Twin City Furnace Company uses the old house field as a cushion to maintain a pre-desired annual volume. If, for example, new house volume should fall off, pressure is used to increase old house work. If new house volume is sustained, pressure for old house work can be slackened off in order to prevent such a rush of work that the shop, sales and engineering staff is over-loaded.

Classified as old house work is replacement, repair, reconditioning of existing furnaces; furnace cleaning; sale of oil burners, conversion gas burners; and alterations to or betterment of existing installations.

(Continued on page 101)





## [ Defense House Heating ] \$100 Duct System

IN Muncie, Indiana, the furnace and sheet metal firm of Shingledecker and a Basey has been installing material-conserving, forced air heating systems of two types in small houses selling for approximately \$4,000 erected by a local builder. The type of house built and the general size are indicated in the two photographs of a single and a group of houses.

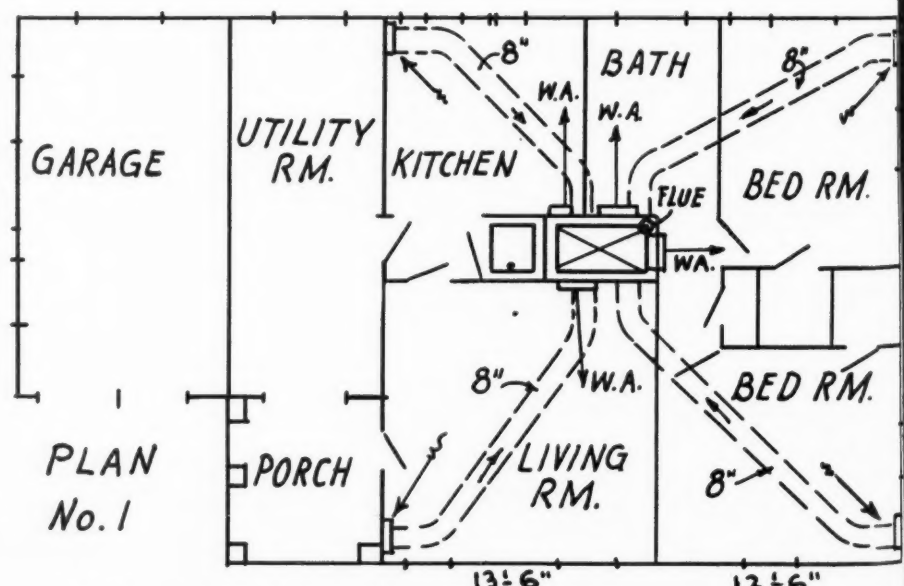
The builder began his project involving about fifty houses by erecting houses on alternate lots.

These first houses followed Plan number 1 and are heated by gas-fired, forced warm air, floor furnaces. With a number of these houses occupied, the builder then began to fill in vacant lots with houses shown in Plan number 2 and in these houses an upright, closet-type, gas-fired, forced warm air furnace is used.

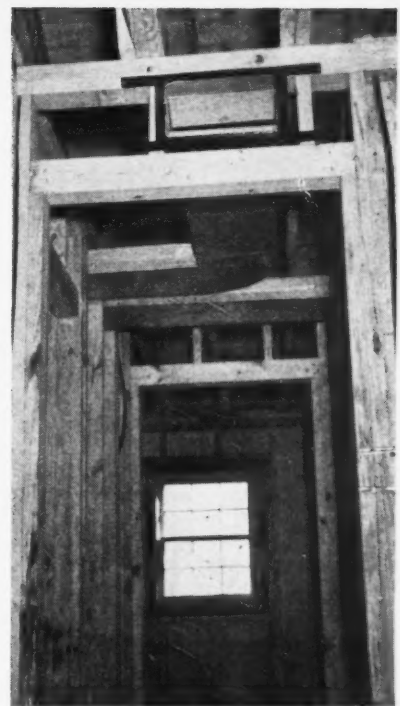
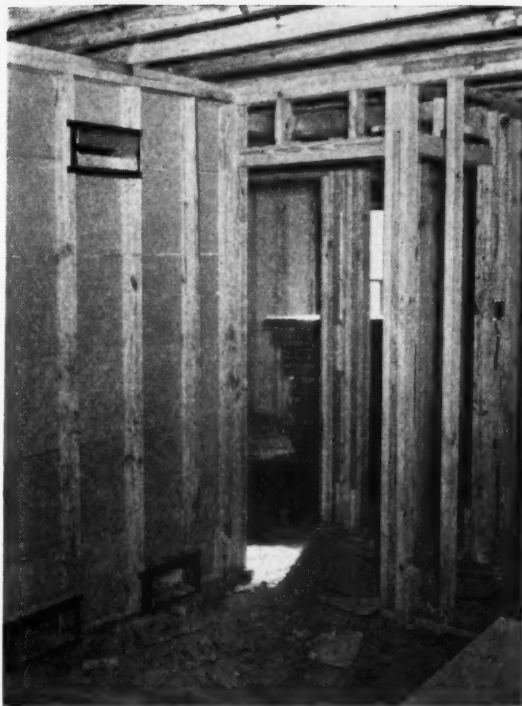
The reason for the change in type of heating plant was due to more uniform, more satisfactory heating obtained by putting warm air directly into each room (note bed rooms in Plan Number 1 are not directly heated) and allowing Shingledecker and Basey a little more money for this better installation.

### Floor Furnace System

As shown in Plan number 1, the floor furnace is placed in a closet and hung from the floor. A wood framed plenum about 8 inches high is built above the floor level above the furnace and lined with  $\frac{1}{4}$ -inch asbestos board. From this shallow plenum the baseboard registers open directly



The pictures left and Plan number 1 show the floor furnace installation. The asbestos lined, 8-inch high plenum cover is raised, left, to show the furnace beneath the floor. Note baseboard registers in plenum. Photo and plan also show the four-way galvanized pipe returns. Note bed rooms have no direct heat.



**Upright Furnace System**

through the partitions into the rooms or the hall (see plan). Gases of combustion are vented through a straight-up Transite pipe.

Return air is taken from each of the four outside corners—baseboard grilles—through 8-inch round galvanized iron pipe to the blower compartment of the furnace. All joints were stripped with asbestos paper. These return air pipes traverse the space between earth and floor.

Access to the furnace is provided by a trap door in the closet. This trap door, also the furnace, the plenum, the return air pipes are shown in one photograph.

#### Bed Rooms Have No Direct Heat

Warm air is introduced into the kitchen, bath, living room, and the small hall which opens to the two bedrooms. Thus the two bedrooms are heated only with the doors open and one bedroom, at least, is removed from the warm air register by a few feet of hall.

In these systems there is practically no warm air duct work, only stubs from the plenum through the partition to the register. The four runs of 8-inch round galvanized iron pipe in the return side required approximately 70 feet of pipe plus eight elbows.

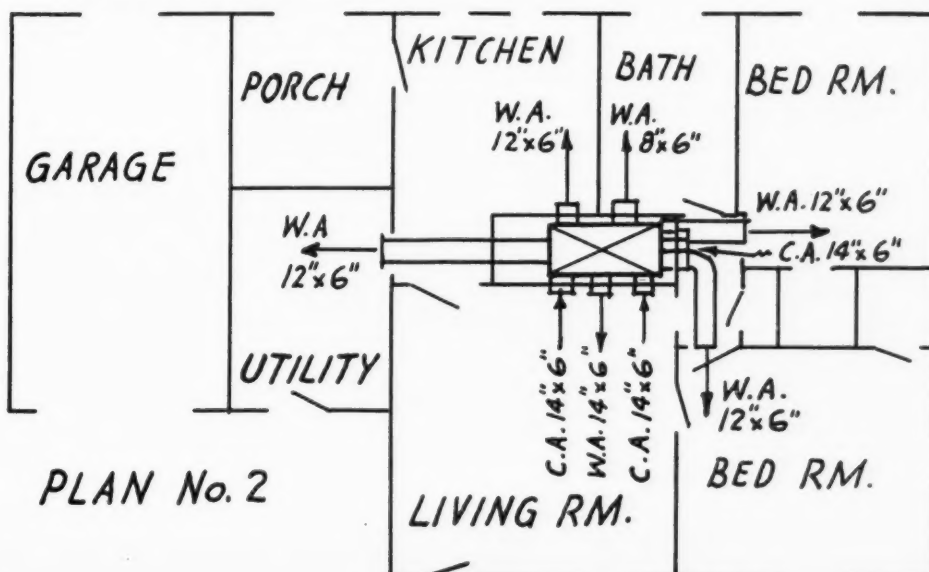
The upright, gas-fired, forced warm air system is shown in Plan number 2. The layout of rooms, room dimensions and location of the furnace are practically identical with the first houses built, except that the porch and utility room are reversed and the utility room is heated.

The furnace is located in a tight closet lined with plaster board and plastered so that stub pipes serve the registers in the kitchen, bath and living room. One run of pipe without fittings or turns goes to the utility room. Another straight-out run goes to the rear bedroom opening through a register directly above the door. One other run is required—to the front bedroom—and this run takes one flat elbow to turn down the hall.

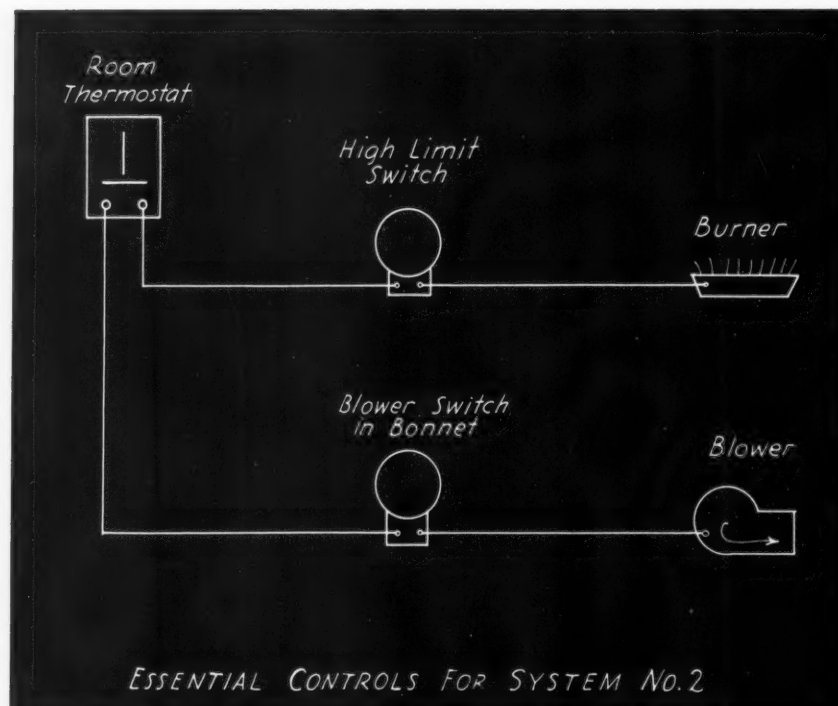
The two pipes through the hall are concealed by plaster board and are wrapped with one inch of insulation. The run to the utility room is likewise wrapped in insulation and is concealed by a furred down ceiling through the kitchen.

Shingledecker and Basey devised a special damper on clips with a lock nut to control the volume at each register. Two of the photographs show this damper and its location. These dampers were used to balance the job and once balanced were locked.

(Continued on page 115)



The photographs above and Plan number 2 show the upright, gas-fired, forced air systems with three stub ducts and three short ducts. Locations of pictures can be picked out on the plan. Note register dampers to balance air delivered. Center picture shows furnace closet with holes for two warm air runs and the baseboard return underneath. This duct system sold for \$100.



The second basic forced air control in simplified diagram. All additional instruments are only safeguards or refinements, or economizers. In this system, the room thermostat starts and stops both the fire and the blower.

## AUTOMATIC CONTROLS

### For Forced Air Heating Systems [Part 4]

In Parts 1, 2, and 3 appearing in January, February, and March, 1942, the essential controls for System No. 1 were described. The author seeks to show that there are only two basic control systems—but many modifications and variations created by the use of modern instruments. These modifications serve only to protect or refine the operation of the plant.

By S. Konzo

Special Research Assistant Professor,  
Engineering Experiment Station, University of Illinois

#### Control System No. 2

**QUESTION 55.**—In our previous discussions we have covered the control system which you have designated as system No. 1. What distinguishes system No. 2 from No. 1?

**ANSWER 55.**—You will recall that the main feature of system No. 1 was that the room thermostat controlled *only* the operation of the burner and that the blower switch (or bonnet thermostat) controlled *only* the operation of the blower.

In system No. 2, the room thermostat controls the operation of *both* the burner and the

blower as shown in the simplified diagram, in Fig. 1. The typical operating cycle is such that when the room thermostat is satisfied both units stop operating.

**QUESTION 56.**—Is there any possibility of blowing air at low temperatures into a room?

**ANSWER 56.**—No, provided that a low limit switch in the bonnet is used, as shown in Fig. 1, to stop the operation of the blower when the bonnet air temperature falls to some predetermined value, of say 135 deg. F.

**QUESTION 57.**—Should not some protection be



added to the control system to make the blower operate when bonnet temperatures are high even though the room thermostat may not be demanding heat?

ANSWER 57.—Yes. This is ordinarily done by adding an overrun switch in the bonnet thermostat. This switch is usually set so that the blower operates whenever the bonnet temperature reaches about 200 deg. F. This is purely a protective device that prevents overheating of the bonnet and corresponds to a safety valve in a steam boiler. It is an essential requirement of control system No. 2, although for normal operation the bonnet temperatures may never attain 200 deg. F.

QUESTION 58.—Would it not also be advisable to stop the combustion process when the temperature in the bonnet reached some predetermined value?

ANSWER 58.—Yes indeed. The high limit switch shown in Fig. 1 serves to stop the combustion process, whenever the bonnet temperature exceeds some predetermined temperature—say 175 deg. F., even though the room thermostat may still be demanding heat.

QUESTION 59.—If I understand you correctly then, system No. 2 incorporates four elements composed of:

- 1—a room thermostat
- 2—a low limit switch to shut the blower
- 3—a high limit switch to shut the burner
- 4—an overrun switch to operate the blower.

ANSWER 59.—That is correct. The first three elements are shown in Fig. 1, but the overrun feature is not indicated, since it does not ordinarily have anything to do with normal operation of the blower and burner.

QUESTION 60.—Does the fact that three separate elements are needed in the bonnet thermostat mean that three separate enclosures or housings are needed?

ANSWER 60.—Obviously not. A single case or enclosure usually contains all three necessary elements. It should be noted that this bonnet thermostat case is the common meeting ground for the electrical wires from the room thermostat, the line, the blower, and the burner. Wiring directions must be carefully followed if all the elements are to function properly.

QUESTION 61.—From the description you have given me it would appear that system No. 2 is more complicated and hence more expensive to purchase than system No. 1 described previously.

ANSWER 61.—That is the case. System No. 2 is not as commonly used as system No. 1.

QUESTION 62.—If such is the case why is it used at all?

ANSWER 62.—System No. 2 has the one funda-

mental advantage that the room temperatures are not allowed to over-run or under-run. If a two-degree difference in room temperature is required to operate the forced air heating system, the room temperatures will be maintained within that two-degree limit.

QUESTION 63.—I understand that system No. 2 works equally well whether the furnace is hand-fired, stoker-fired, oil-fired, or gas-fired?

ANSWER 63.—That is correct. Any heat storage in the furnace and fuel bed will not cause any under-runs or over-runs in the room temperature, since the room thermostat is the main controlling device of both the blower and the burner.

QUESTION 64.—With the use of system No. 2, is the bonnet air temperature always maintained between the two fixed temperature limits, of say 175 deg. F. and 135 deg. F.?

ANSWER 64.—Since the burner is shut off when the bonnet temperature exceeds 175 deg. F. and the blower is shut off when the bonnet temperature falls to 135 deg. F., ordinarily the bonnet air temperature falls somewhere within these two limits. In *normal* operation the bonnet temperature may not reach either extreme but may "float" between two values which are intermediate. For example, on a mild day the bonnet temperature may rise to 150 deg. F. and drop to 135 deg. F., whereas on a cold day the bonnet temperature may "float" between 175 deg. F. and 135 deg. F.

QUESTION 65.—I still don't understand the process. Do you mean that the *average* bonnet temperature changes with the heating demand?

ANSWER 65.—Exactly. If the heating demand is light the average bonnet temperature automatically seeks a low level. Furthermore, as the heating demand increases, the average bonnet temperature automatically seeks a higher level.

Have you ever stopped to consider that with this system of controls, the temperatures in the bonnet are not governed by a random spirit, but are governed by a force that keeps the temperatures in a "straight and narrow" path at all times.

QUESTION 66.—That sounds almost foolproof. Does system No. 2 act similarly to system No. 1 when the setting of the bonnet thermostat is lowered?

ANSWER 66.—In both systems Nos. 1 and 2, lowering the scale setting of the bonnet thermostat results in longer operation of the blower.

QUESTION 67.—Do you consider longer operation of the blower more desirable?

ANSWER 67.—Indeed yes. It is especially desirable to maintain a lower setting of the bonnet

(Continued on page 116)

# FUEL SAVING by Reducing Room Temperatures at Night\*

FIGURE 18 shows a typical record of test observations for 24 hrs., during which the thermostat was set at 60 deg. F. for a period of 6.5 hrs. and at 72 deg. F. for a period of 17.5 hrs. At 10:00 p. m. the room thermostat was set at 60 deg. F., and at 1:25 a. m. the room air had cooled to this temperature. The house was maintained at 60 deg. F. until 4:30 a. m., and at that time the room thermostat was set at the normal operating temperature of 72 deg. F. From this time the burner operated continuously until 8:52 a. m., and the room air temperature rose to 72 deg. F. During the remainder of the time until 10 p. m. the room air temperature was maintained at 72 deg. F., accompanied by intermittent operation of the fan and burner. The conditions shown in Fig. 18 were not exactly duplicated each night, since the time required for the room air to cool from 72 deg. F. to 60 deg. F. was dependent on the prevailing outdoor conditions. Furthermore, the time required for the temperature of the house to rise from 60 deg. F. to 72 deg. F. was dependent not only on the outdoor conditions, but also on the rate of heat liberation in the furnace. The factors which influenced the time required for the cooling and heating processes are more fully discussed in Sections 31 and 32.

## Gravity System Savings

In the case of the tests formerly made with a gravity warm-air furnace installation, and reported in Engineering Experiment Station Bulletin No. 246, reducing the room air temperatures to 60 deg. F. at night was accompanied by a sacrifice of comfort in the house during most of the hours before noon, brought about by the influence of cold walls and floors persisting over most of this period. This condition was not as noticeable in the case of the forced-air installation, since the circulation of greater amounts of air tended to distribute the heat more evenly over the entire room, rather than largely at the ceiling, as in the case of the gravity plant. The more positive and uniform distribution of the warm air decreased the time required for the room temperature to attain a normal value, and thus minimized the disadvantages accompanying this method of operation with the gravity plant.

The records of flue gas temperatures and per-

centages of CO<sub>2</sub> in the flue gas are also shown in Fig. 18. During the warming-up period when the combustion took place in a relatively cold firepot and combustion chamber, the draft was at a minimum value, and the amount of induced air, in excess of that normally provided by the fan on the burner unit, was also at a minimum. This resulted in traces of light grey smoke and a higher percentage of CO<sub>2</sub> in the flue gas than that obtained under conditions of normal operation. After the burner had been in continuous operation for several hours both the flue gas temperatures and the stack draft attained normal values, and no traces of smoke were visible. Although the draft regulating damper was set to maintain a constant draft of 0.02 in. in the combustion chamber, the damper opening was not quite sufficient to maintain the draft at this value. Hence, the slight increase in draft under normal operation was accompanied by a slightly larger amount of induced air entering the firepot and by a somewhat lower percentage of CO<sub>2</sub> in the flue gas. These data indicate that the adjustment of the air inlet to the burner for the proper ratio of air to fuel in the case of intermittent operation was not strictly applicable under conditions of continuous operation after the burner had been shut down for several hours. However, these slight variations in the air requirements did not seriously affect the operating efficiency.

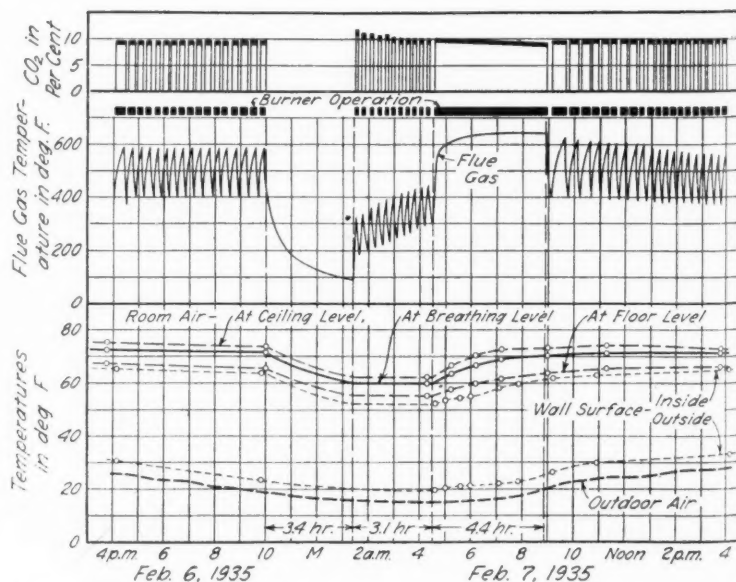


Fig. 18—Log of warming-up test for conversion unit.

\*Reprinted from Bulletin 318, Engineering Experiment Station, University of Illinois.

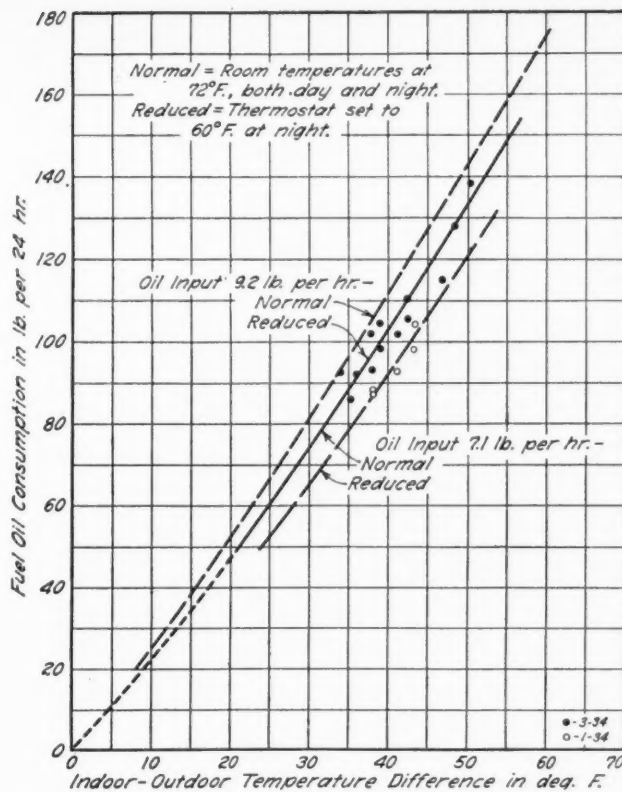


Fig. 19—Fuel consumption with reduced room temperatures at night.

#### Fuel Consumption

The amounts of fuel required when the room temperature was maintained constant both day and night and when it was reduced during the night, were plotted against the differences in temperature between the indoors and outdoors, as shown in Fig. 19. The data for fuel consumption under the two conditions of operation were obtained with two rates of oil input to the burner, namely with rates of 7.1 lb. per hr. and 9.2 lb. per hr. The curves indicate that by reducing the house temperatures at night a decrease in oil consumption of approximately 7 to 9 per cent was effected for the 9.2 per hr. rate, and a decrease of approximately 11 per cent for the 7.1 lb. per hr. rate. These results are comparable with the 4 to 8 per cent reduction reported in Engineering Experiment Station Bulletin No. 246 for a gravity furnace equipped with a conversion gas burner of the surface combustion type.

#### Calculated Values of Fuel Saving

By using an estimated average value for the indoor temperature, it is possible to calculate the probable fuel saving which would be obtained by reducing the room temperatures at night instead of maintaining a constant room temperature. The following equations\* for determining the values of indoor temperatures and fuel savings are based

\*A.S.H.V.E. Guide for 1939, p. 236.

on the method given in the Guide of the American Society of Heating and Ventilating Engineers:

$$t_a = \frac{N_d t_d + N_n \cdot t_n}{24}, \text{ and} \quad (1)$$

$$S = 100 \times \frac{t_d - t_a}{t_d - t_o} \quad (2)$$

in which

$t_a$  = average indoor temperature during 24-hr. period, deg. F.

$t_d$  = indoor temperature during day, deg. F.

$t_n$  = indoor temperature during night, deg. F.

$t_o$  = average outdoor temperature during heating season, deg. F.

$N_d$  = number of hours in the day that  $t_d$  is maintained

$N_n$  = number of hours in the day that  $t_n$  is maintained

$S$  = calculated fuel saving, per cent

By substituting numerical values from Fig. 18 in the equations, the theoretical fuel saving can be obtained for conditions similar to those which were maintained in the Research Residence tests. Thus

$$t_a = \frac{17.5 \times 72 + 6.5 \times 60}{24} = \frac{1650}{24} = 68.8 \text{ deg. F.}$$

$$S = 100 \times \frac{72 - 68.8}{72 - 38^*} = 100 \times \frac{3.2}{34.0} = 9.4 \text{ per cent}$$

The actual fuel saving of from 7 to 11 per cent is in good agreement with the calculated value of 9.4 per cent.

The use of Equations (1) and (2) is limited to certain conditions which have been represented in the temperature diagram shown in Fig. 20. The indoor temperature is assumed to change with time, in a manner represented by the line  $a-b-c-d$ . Due to the heat storage capacity of the building during the cooling process, and the delay or "lag" in warming the building, the indoor temperature will actually change in some manner similar to that represented by the line  $a-b'-c-d'$  in Fig. 20. When the actual indoor temperature cycle, as represented by the line  $a-b'-c-d'$ , approaches the theoretical cycle, as represented by the line  $a-b-c-d$ , the agreement between the theoretical value and the actual value of the average indoor temperature  $t_a$ , will be close. This condition is approxi-

\*An average outdoor temperature for Urbana, Illinois, of 38 deg. F. was selected from Table 1, Chapter 8, p. 146 of the A.S.H.V.E. 1939 Guide, which gives values for Chicago of 36.4 deg. F. and for Springfield, Illinois, of 39.8 deg. F. Urbana is approximately mid-way between these two listed stations.



mated when the area  $a-b'-c-d'-a$  approaches the area of the rectangle  $a-b-c-d-a$ , or when the area  $a-b-b'-a$  approaches the area  $d-c-d'-d$ . The calculated saving of fuel will not be obtained in practice if the actual conditions deviate markedly from those assumed. For example, a calculated saving of 17.6 per cent would be indicated if the house temperature were reduced to 50 deg. F. at night, instead of to 60 deg. F. as in the first example:

$$t_a = \frac{17.5 \times 72 + 6.5 \times 50}{24} = \frac{1585}{24} = 66.0 \text{ deg. F.}$$

$$S = 100 \times \frac{72-66}{72-38} = 100 \times \frac{6}{34} = 17.6 \text{ per cent}$$

This saving might be obtainable if, when the average outdoor temperature during the night was 38 deg. F., the indoor temperature decreased to 50 deg. F. in 6.5 hrs. Actually, as shown in Fig. 21b, when the average outdoor temperature was 38.0 deg. F., the rate of cooling was about 1.6 deg. F. per hr. after the burner was stopped. Hence, in a 6.5-hr. cooling period, the house temperature would decrease  $6.5 \times 1.6$  deg. F. = 10.4 deg. F., or from 72 deg. F. to only 61.6 deg. F. A total decrease in temperature of 22 deg. F. in 6.5 hrs., or an average cooling rate of 3.4 deg. F. per hr., would be obtainable only in very cold weather when the average outdoor temperature at night was less than 15 deg. F. Therefore, over the greater portion of the heating season the actual fuel saving would be much smaller than 17.6 per cent. The values given in Fig. 21b are average cooling rates based on the entire period of cooling and include the high initial rate shown in Fig. 21a. Reasonably close estimates of fuel savings can be made only if the rate of cooling of the structure during average outdoor weather conditions is known. The cooling rates indicated in Fig. 21 probably are not applicable to con-

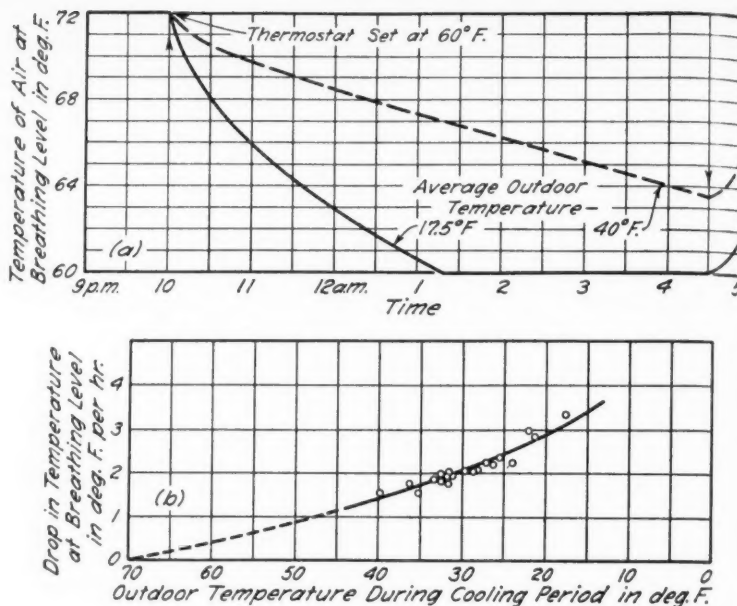


Fig. 21—Rate of cooling of Research Residence.

structions that differ materially from the typical uninsulated frame wall construction of the Research Residence.

#### Warming-Up Period

In the discussion in Section 31 it has been assumed that the efficiency of the heating unit is the same whether it is operated intermittently, as in normal operation, or whether it is operated continuously, as in the warming-up periods in the morning. Obviously, for conditions under which the heating efficiency decreases as the length of the on period of the burner increases, the fuel saving effected by reducing the room temperature at night would be offset by the increased losses occurring during the warming-up period which is accompanied by continuous operation of the burner.

The efficiency of heating units varies in this respect, depending upon the fuel burned and the method of operation. In a hand-fired, coal furnace\* the heating efficiency usually decreases with increases in the combustion rate. Hence, the actual saving effected by reducing the house temperatures at night may be considerably less than the calculated fuel saving. The use of protective or limit controls† placed in the smoke pipe would prevent the attainment of excessive flue gas temperatures and combustion rates, and would reduce the losses occurring during the warming-up period. The limiting action of such controls on the rate of combustion would tend to lengthen the warming-up period and to prevent overheating the furnace. In a large number of hand-fired

(Continued on page 112)

\*Typical curves of efficiency for hand-fired coal furnace are shown in Bulletin No. 246, Univ. of Ill. Eng. Exp. Sta., Chapter V, Fig. 37, page 85.

†Operating records obtained in a forced-air heating plant with such a control are shown in Bulletin No. 266, Univ. of Ill. Eng. Exp. Sta., Chapter VIII, Fig. 31, p. 87.

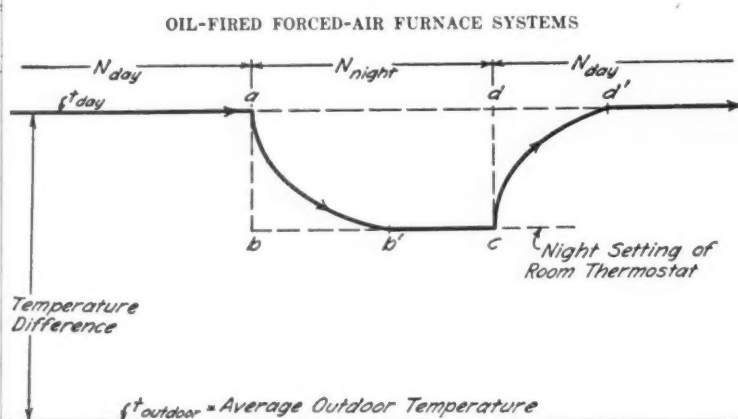


Fig. 20—Diagram showing changes in indoor temperature.

# Rudiments of Small Stoker Operation [Part 4]

By S. H. Viall

Chief Combustion Engineer  
Chicago, Wilmington & Franklin Coal Company

This article is one of a series of copyrighted articles published in The Rescreener, house organ of the Chicago, Wilmington & Franklin Coal Company, under the title—"Along the Firing Line."

IN perhaps five out of every hundred stoker installations an automatic control of the "natural" draft may not be satisfactory, because in these few cases the natural draft is already inadequate, due to overloading chimneys, long smoke-pipes, or smoke-pipes with numerous turns. In the other ninety-five out of every hundred cases an automatic (barometric) control of the natural draft will provide more satisfactory service and lower coal consumption. The benefits are so pronounced, in comparison with the modest expense of installation, as to make such controls advisable with both old and new stokers.

A barometric or natural draft control can maintain a substantially constant strength of natural draft in the firebox. The operation of stokers with a constant, minimum natural draft means:

- (1) more satisfactory service and less coal because with slower burning during "off" periods the fire is in better condition when the stoker goes "on" again,
- (2) reduced possibility of "puff-backs" when the fire door is opened,
- (3) fewer and weaker coke-trees.

## Forced vs. Natural Draft

With the underfeed stoker air is moved through the fuel bed by two forces, or sources of pressure: (1) the push of the forced draft; and (2) the pull of the natural draft. We all know from our experience with hand firing how the natural draft varies. On a cold, windy day it is quite strong, but on a warmer, sultry day there may be almost no draft at all. The barometric control is designed to smooth out these fluctuations before they reach the fire. The modest priced ones adaptable for small underfeed stokers are of two types: the opening check draft, and the movable damper inside the smokepipe. Both of these controls are based on the principle of the hand operated controls on hand fired plants, but have been greatly improved by the addition of devices which make the operation automatic.

When the natural draft is not controlled, it is common to find cases where the natural draft is 25 to 50 per cent as strong as the forced draft. For illustration, think of the strength of the forced draft as number 2 and the natural draft as number 1. In such a case the total forces moving air through the fuel-bed is represented by the number 3. When the stoker fan stops, two-thirds of the force supplying air is removed, but

the natural draft (one-third of the total force) is still pulling air through the fire. Under such conditions the air drawn through the fuel bed by natural draft, after the stoker fan stops, will cause the fire to continue burning rapidly (rather than "hold") and often eats up so much of the fuel that there is not enough in the fire-box when the stoker starts again. This excessive natural draft is an important factor among the causes that lead stoker owners to call for help from servicemen.

Far more satisfying and economical results could be obtained if the natural draft were reduced to the minimum required to move the gases out of the fire-box. For example, suppose that the strength of the total draft is 3, as in the first illustration, but with the forced draft represented as 2.8 and the natural draft as 0.2. When this stoker fan stops, only 1/15th of the total force continues moving air through the fuel-bed. (Approximately one-fifth the strength of the natural draft in the first illustration.) Under these circumstances the "off" period really means "hold-fire." The fuel will burn more slowly and the fuel-bed will probably be in good condition when the stoker starts again.

## Air Tube Flap Dampers

Some stokers are provided with a swinging plate in the discharge duct from the fan. When the fan is operating, the blast air pushes the plate up and air passes into the fire-box. When the fan is idle, this plate swings downward and partially closes off the air moving by force of natural draft. Such checks on the flow of air by natural draft do help, but they are not the complete answer to the problem. To observe that air is passing through the fan during "off" periods of a stoker equipped with such a plate, hold a lighted match near the partially open inlet to the idle fan. If there is a strong natural draft in the firebox, there will be a noticeable drawing into the fan housing of the match flame. This will not indicate quantity, but it will show that air is passing through the fan. Some air is needed to keep the fire going, but even these check flaps will in many cases admit more air than is needed unless a natural draft control is used. A combination of a well designed check flap and natural draft control properly adjusted will give the most satisfactory results.

Restricting the flow of air through the fuel-bed

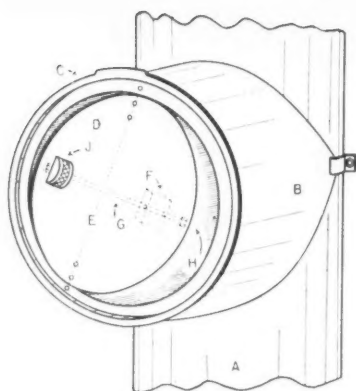


Fig. 14—Draft-O-Stat. Made by The Hotstream Heater Company, 8007 Grand Avenue, Cleveland, Ohio.

A, smoke pipe. B, sheet iron connection attached over hole in smoke pipe. C, an assembly ring that permits setting regulator to proper position with reference to a vertical line. D, movable plate. E, single dotted line, axis on which D moves. More than half the area of D is to the right of axis E. F, a weight behind plate D that tends to keep that plate in a closed position. G, the rod with screw thread on which weight F is mounted. H, direction of opening swing of plate D. J, knurled knob on rod G. The adjustment for strength of draft required to move plate D is made by turning knob J.

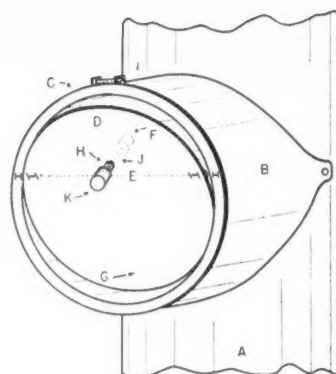


Figure 15—Walker "Junior." Made by Walker Manufacturing & Sales Corp., 1711 Penn St., St. Joseph, Mo.

A, smoke pipe. B, sheet iron connection attached over hole in smoke pipe. C, an assembly ring that permits setting regulator to proper position with reference to a vertical line. D, movable plate. E, dotted line, axis on which D moves. More than half the area of D is below the axis E. F, a weight to the rear of plate D that tends to keep plate D in closed position. G, direction of opening swing of plate D. H, threaded piece attached to plate D. J, threaded rod to which are fastened weight F (inside) and weight K outside. The adjustment for strength of draft required to move plate D is made by turning rod J and changing position of K and F.

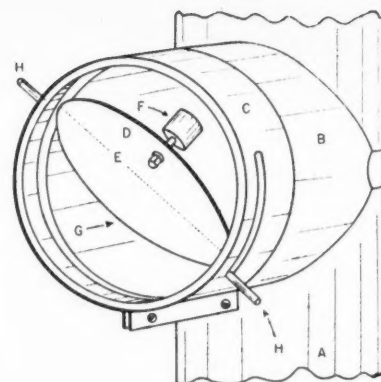


Figure 16—Preferred Draft-A-Justor. Made by Preferred Utilities Manufacturing Corporation, 33 West 60th Street, New York, N. Y.

A, smoke pipe. B, sheet iron connection attached over hole in smoke pipe. C, collar that permits setting regulator to proper position with reference to a vertical line. D, movable plate. E, dotted line, axis on which D moves. More than half of area of D is below axis E. F, weight that tends to keep plate D in a closed position. G, direction of opening swing of plate D. Plate D is mounted on a ring set inside of collar C. Said ring can be moved by handles H, H'. The adjustment for strength of draft required to move plate D is made by moving handles H, H'.

during "off" periods by means of a natural draft control and a flap damper in the air duct also has an influence with some coals toward reducing the formation of coke-trees.

Approximately 20 pounds or more of gases pass out of the fire-box, moving through the boiler or warm air heater and smoke-pipe to the chimney for each pound of coal used. In home stokers these gases must be moved by the natural draft. The volume of gas passing to the chimney varies directly with the rate of burning. The hand-operated turn damper is impractical because of the frequencies of changes needed to meet all the varying conditions caused by the "on" and "off" periods of the stoker, the influence of thick and thin fuel beds, and the fluctuating natural draft pressures. The hand-operated damper must be set to take care of the largest volume of gases to be handled before the next time the damper is attended. Usually it is opened wide and left that way.

Most small stokers operate less than 50 per cent of the time even in the coldest weather, between 20 and 25 per cent of the time in average weather, and less than 10 per cent of the time in the mild weather of early fall and late spring. During the "on" period enough coal must be fed in to accomplish three purposes:

- (1) to furnish heat during that "on" period,
- (2) to hold the fire until the next "on" period

(here is when natural draft controls are most needed), and

- (3) to have enough fuel in the fire-box for the forced draft to work with efficiently when the stoker starts again.

If a stoker feeds coal 30 minutes per hour in the coldest weather, there are 30 minutes in which to build up a supply of coal for use by the natural draft during the next 30 minutes. In average weather when the stoker operates only 12 to 15 minutes each hour, it must build up a supply of coal large enough to withstand the natural draft for 45 minutes and in mild weather it has only six or seven minutes to build up a 54 minute supply. Since the stoker has so few minutes to feed coal as compared to the many minutes natural draft works on the coal, it is plain that the natural draft must be automatically kept at a minimum practically during the "off" periods if the stoker is to give economical and satisfactory service. During average or mild weather the "off" periods are longer and the benefits of automatic control of natural draft most noticeable.

One way to avoid many of the complaints that will soon start coming in is to check the stokers for which you are furnishing coal. If you find an excessive natural draft, recommend a natural draft control.

On the market, today, are a number of devices designed to maintain automatically, under



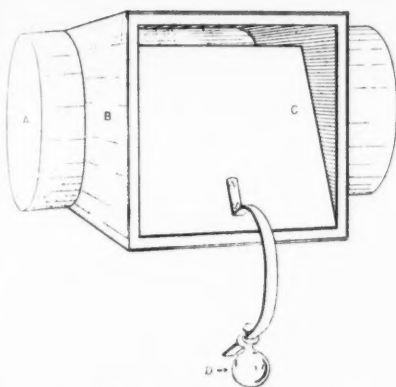


Figure 17—"Sim-Trol." Made by Simplex Manufacturing Company, 202 North Main Street, Fond du Lac, Wisconsin.

A, smoke pipe. B, sheet iron connection attached over hole in smoke pipe. C, movable plate. D, weight that tends to keep plate C in a closed position. The adjustment for strength of draft required to move plate C is made by changing the position of weight D or varying its amount.

This manufacturer makes another model adaptable to smoke pipes set at an incline.

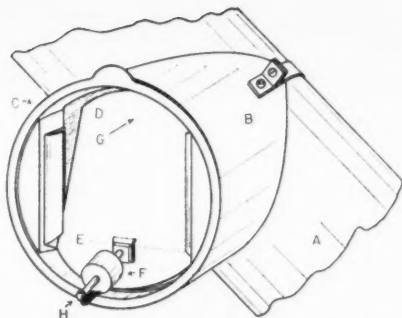


Figure 18—Field Barometric Draft Control. Made by Field Manufacturing Company, 2328 Nelson Street, Chicago, Illinois.

A, smoke pipe. B, sheet iron connection over hole in smoke pipe. C, an assembly ring that permits setting regulator to proper position with reference to a vertical line. D, movable plate. E, dotted line, axis on which D moves. F, a weight that tends to keep plate D in a closed position. G, direction of opening swing of plate D. H, a rod with screw thread along which weight F can be turned. The adjustment for strength of draft required to move plate D is made by turning weight F along rod H.

rather widely varying conditions, substantially constant and minimum natural draft in the fire-box. Several of these are moderately priced and are adaptable for use with small stokers. In most cases they are made in sizes for smokepipes from four to 20 inches in diameter, although larger sizes are also available. Some of the controls, to better accommodate various installations, are made in more than one model. There are models to fit the rectangular smoke flue. These controls, adaptable to underfeed stokers, are of two types: the opening check draft, and the movable control damper inside the smoke pipe.

#### Opening Check Draft Type

Figures 14 to 18 are of the opening check draft type of control. This type controls the natural draft in the fire-box by admitting more or less fresh air into the chimney or smoke-pipe. The chimney gases are cooled by the "fresh" air which has not been drawn through the fire-box. This cooling reduces the pulling power of the chimney. Also, the "fresh" air increases the weight of gaseous material moved by natural draft. This further reduces the strength of the natural draft in the fire-box.

The opening check draft type of controls all have the following five characteristics:

- (1) A swinging plate is mounted off-center with one surface exposed to the pressure of the air outside the smoke-pipe, the other exposed to the pressure of the gases inside. Because the pressure outside the smoke-pipe is always greater than that inside, the off-center mounting allows the plate to be pushed inward admitting "fresh" air to the chimney. To counteract this tendency a weight is attached to the plate.

- (2) The force of draft required to cause the plate to swing toward an open position is determined by the adjustment of this weight.
- (3) The control operates by automatically admitting "fresh" air to the chimney when the natural draft exceeds the strength for which the control is adjusted.
- (4) There is an arrangement by which the axis of the movable plate can be placed at the proper angle whether the control is installed on a horizontal, inclined, or vertical smoke-pipe.
- (5) The opening check-draft type of control can be attached directly to the chimney, preferably at a level below the smokepipe, if that would be easier than attaching it to the smokepipe.

#### Movable Damper Inside Smoke-pipe

Figures 19 and 20 are examples of controls that automatically change the position of a damper in the smoke-pipe to control the strength of natural draft in the fire-box. Because this control does not depend upon the admittance of excess air to the chimney for reducing the natural draft in the fire-box, it is advantageous in those installations where a comparatively warm temperature is desired in the room in which the control is located. Some air does enter the chimney through these controls. If it were otherwise, the plates that are moved by air pressure would have to fit too snugly for practical operation. The descriptions under figures 19 and 20 give the details of how this type of control operates.

Only an occasional few minutes are required to keep the automatic controls in good working order. The most important consideration is to see that the bearings, shafts and threads are clean. If the control plate does not move freely, the affected parts should be cleaned with kerosene or penetrating oil, or scraped. If oil is used for a lubricant, it may form a gum that could interfere with the proper operation of the controls. Powdered graphite is a good lubricant. Usually the controls described operate with the cleaned parts dry.

#### The Hand Turned Damper

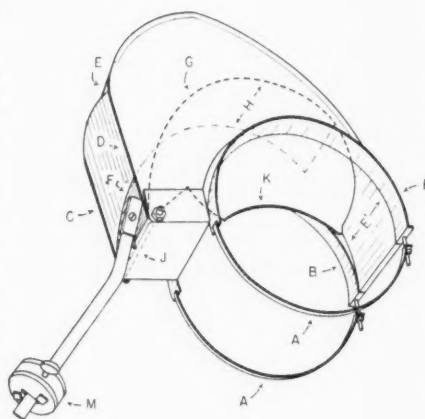
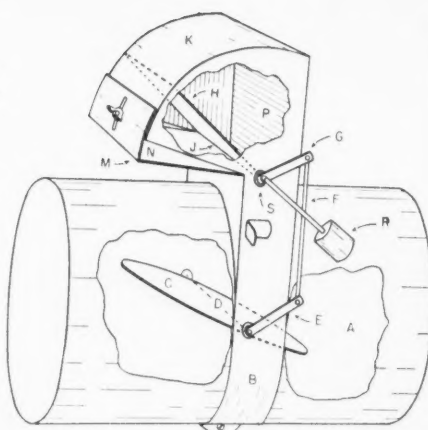
Numerous plants have an abundance of natural draft and depend on partially closed hand operated dampers to control the natural draft in the fire-boxes. In such plants the automatic barometric control will avoid "puff backs" that result from failure to have the damper open when working with the fire or when putting rubbish into the fire-box. The automatic control is also helpful in many hand-fired plants for this same reason.

## Top

Figure 19—Cole Draft Governor. Made by Cole-Sullivan Engineering Company, 1316 North Third Street, Minneapolis, Minnesota.

A, inside the smoke pipe on the firebox side of regulator. B, sheet iron supporting regulator and enclosing hole in the half of smoke pipe nearest housing K. C, movable plate in smoke pipe. D, dotted line, axis on which damper C moves. E, F and G, arms and rod connecting movable plate C to movable plate H which is attached to a shaft along the end J. K, housing enclosing movable plate H. M, adjustable plate for controlling area of opening at N. P, space back of movable plate H; this space is connected with smoke pipe on the A side of axis D of movable plate C. R, counter weight for balancing the assembly including the movable plates C and H. S, end of the shaft to which movable plate H is attached. On the opposite end of that shaft, outside the housing, is a pulley with chain and weight that tends to keep movable plates C and H in a horizontal position. The pulley, chain and weight are not visible in this view. The adjustment for strength of draft required to move plate C is made by changing the amount of weight on said chain.

Under operating conditions the pressure of air at P is substantially the same as the gases at A. The pressure of the air at N is higher than at P. Because of the greater pressure at N the air tends to push the movable plate H toward P. At the same time H moves toward P, plate C moves toward a position at right angles to the center line of the smoke pipe and reduces the draft on the fire-box side of the



regulator. The weight attached to a pulley on end of shaft opposite S controls the positions movable plates C and H will take and thereby governs the strength of draft at A.

This control can be installed on a horizontal, inclined or vertical smoke pipe.

## Bottom

Figure 20—Teesdale Bara-Matic Damper. Made by Teesdale Manufacturing Company, 427 Market Avenue, Grand Rapids, Mich.

The device is fastened over an opening in half the smoke pipe by the straps A, A' and angle irons B, B'. The plates C and D with cover sheet E, E' make a housing over the opening in the smoke pipe. F and G are the left and right hand edges of a movable curved plate H that turns on the axis, dotted line. J. K, is a plate attached to H along the line G. M, weight, on an arm attached to plate H, that tends to hold gate K in an open position.

As the diagram is drawn, the firebox is to the left of the device. Under operating conditions the pressure of the air above the plate H is higher than that of the gases below it. Because of the greater pressure above plate H the air tends to push the movable plate H toward the smoke pipe. At the same time H moves toward the smoke pipe plate K moves into the smoke pipe and reduces the draft on the firebox side of this gate. The adjustment for strength of draft required to move gate K is made by changing the position of weight M.

When the regulator is installed on the upper half of the smoke pipe, as illustrated, its adjustment is not readily affected by fly ash.

There are a few cases where the natural draft is so strong that a hand-turn damper can be used between the automatic control and the chimney to reduce the natural draft at the control. In such cases care must be taken that the hand-turn damper is open enough at all times to provide slightly more than the maximum natural draft needed on the chimney side of the control. It will then be possible for the automatic control to reduce the remaining draft to the strength desired in the fire-box.

Where an automatic control of natural draft is installed without removing the hand-operated turn-damper, it is possible that that damper may be placed in a semi-closed position and left that way for weeks at a time. If it is in a horizontal or moderately inclined pipe, fly ash may accumulate and fill the opening under the damper. Then trouble is brewing because someone may stir up the fuel bed or throw rubbish into the fire-box, either of which may cause an unusual volume of gases to be developed. There is a chance that a very rapid burning of these additional volumes of gases may amount to a temporary puff that requires a larger opening for escape toward the chimney than is available around the partially closed hand-turn damper. When the gases cannot escape fast enough toward the chimney, they may move out the open fire-door. To avoid such "puff-backs" it is generally advisable to remove the hand-turn damper, especially in small plants.

If the hand-turned damper is not removed when a barometric control is installed, it should be wired in a wide open position so it cannot be moved.

## Judging the Adequacy of Natural Draft

To judge the draft over the fire proceed as follows:

- (1) Build a good, strong fire with a body of fuel that is 1 to 1½ times as deep as the shortest dimension across the inside of the retort top, with a fire-box free of clinker and containing only a small amount of loose ash.
- (2) With the stoker running normally and with the fire hot and in full operation, open the fire-door wide. There will be a quantity of flame in the fire-box. If the flame comes all the way out of the fire-door, there is not enough natural draft in the fire-box. The causes of insufficient natural draft may be:
  - a. The capacity of the chimney may be too small.
  - b. The smoke pipe may be unusually long or have numerous turns. (Conditions a and b are present in less than 5 in 100 plants. In those cases natural draft controls should not be installed.)
  - c. There may be an excessive accumulation of fly ash in the gas passages of the boiler or heater, in the smoke pipe, or in

(Continued on page 99)

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AMERICAN ARTISAN

# SHEET METAL

SECTION



DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING





**SLOWED DOWN  
BUT NOT STOPPED!**

Business "as usual" is slowed down. The fighting arm of our Nation has first call on materials, production and manpower. Our company is supplying large quantities of SUPERIOR "Checker Coat," Galvanized, Galvannealed, Long Terne and other Superior Sheets for defense plant and ship construction, lifeboats, bombs, ammunition cases and other manufactured products.

We are proud to be able to contribute in some measure

to our Country's victory. We know your sacrifices in this struggle may be relatively greater than ours. Normal business is slowed down, but it must not stop. Let's make the changes necessary. Let's take detours where we must—but *let's not stop*. Let's continue to do the best we can with what we have and to serve in our respective fields to the best of our abilities. To that end, Superior pledges every possible cooperative effort.

**THE SUPERIOR SHEET STEEL CO., Canton, Ohio**

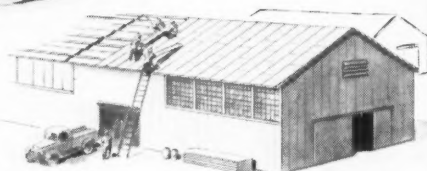
(Division of Continental Steel Corp., U. S. A.)



LIFEBOATS



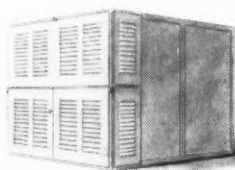
BARRACKS



STORAGE



PRACTICE BOMBS



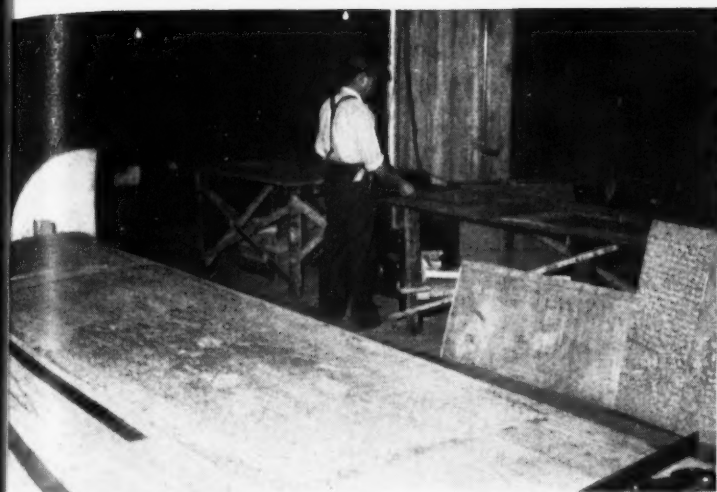
WALK-IN REFRIGERATORS



**SUPERIOR**

CONTINENTAL STEEL CORPORATION





A job shop with lockformer machine, shears, brake, benches was set up in the bank basement. All straight sections, fittings, housings were measured directly on the job and made up in the job shop. At left—sections going through the lockformer. Right—Foreman and layout man marking pieces for cutting.

## Duct Design and Construction To Speed Erection of Wide Ducts

By E. E. HERBACEK

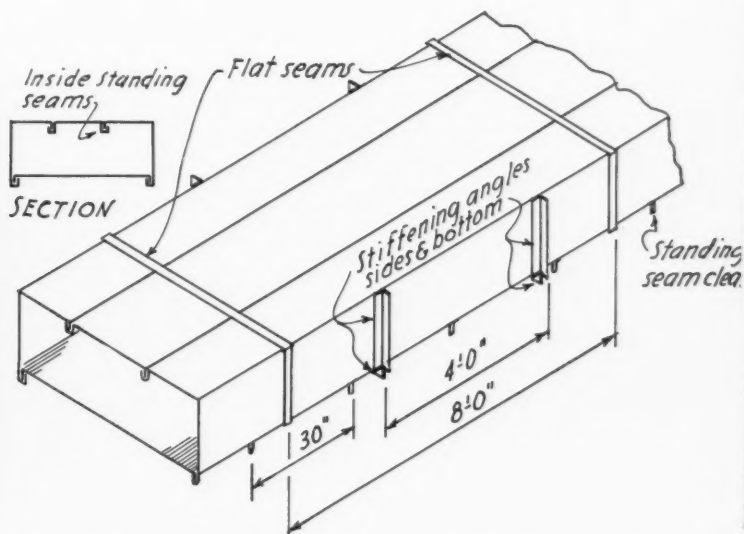
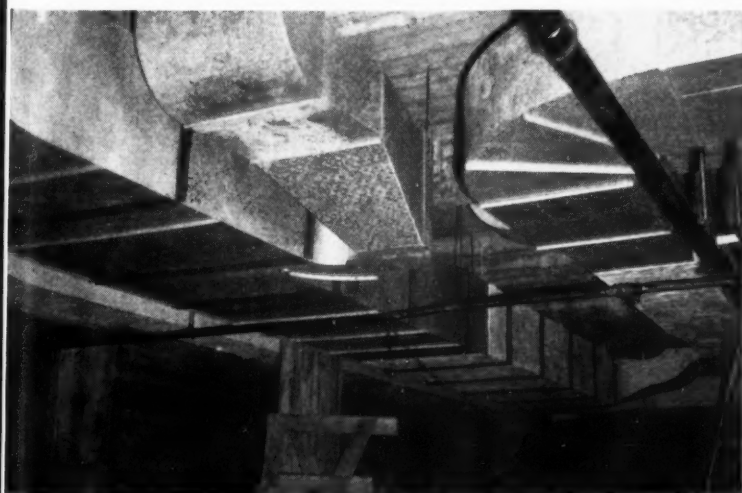
Secretary and Chief Engineer, Spencer Air Conditioning Co.

IN the design and installation of the large ducts required for the air conditioning system in the Farmers & Mechanics Savings Bank in Minneapolis, several interesting practices were adopted. The building is new, heating is by automatically controlled recessed convectors; cooling and air conditioning equipment for year-around air conditioning of the entire building is located in the basement and in equipment rooms on the third floor, large and widely spread duct systems distribute the conditioned air throughout all five floors of the building, and banking space.

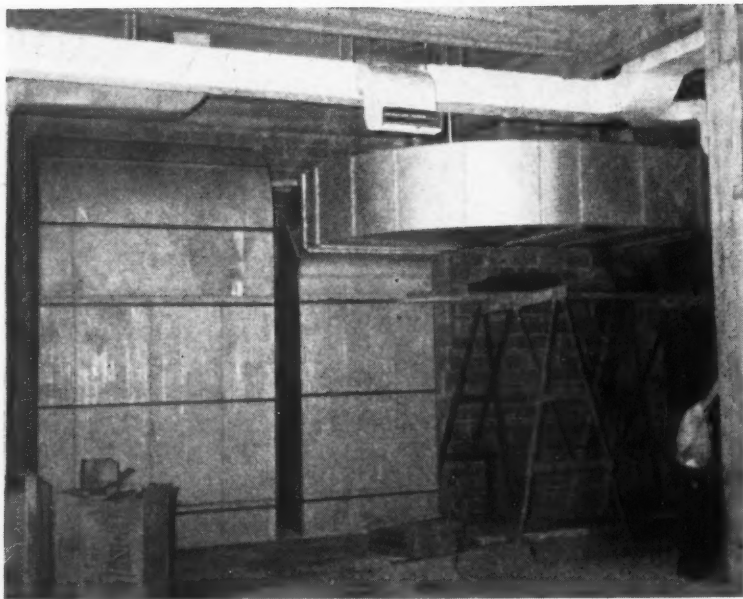
Architects for the building were McNary & Krafft; mechanical engineers, G. M. Orr & Co.;

associate consulting engineer, A. D. Martino; air-conditioning contractor, Spencer Air Conditioning Co.

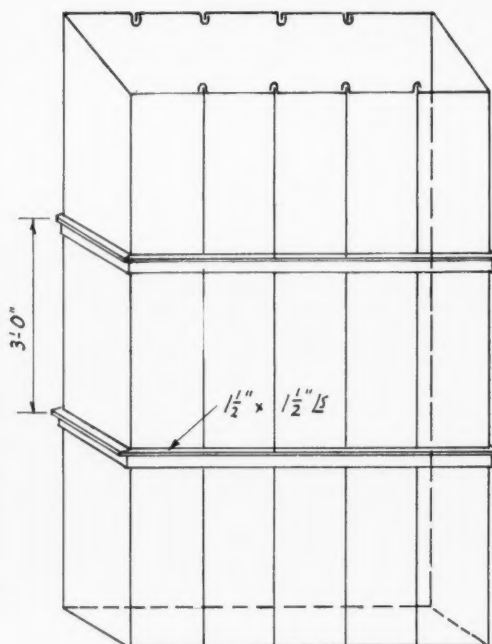
During summer operation, the air conditioning system cools the air by passing it through extended fin surface cooling coils supplied with chilled water from a mechanical refrigeration system. One hundred per cent recirculation or any proportion between can be used. Thus in spring and fall, outside air can be used for ventilation and cooling; in winter cold weather up to about 20 per cent outside air with 80 per cent recirculation will be used. Under full cooling



At left—Some of the large basement pipes where construction followed diagram at right. Note top and side pieces are 8 feet long and flat seamed. Bottom pieces are 30 inches long and have standing seams for stiffening. Further stiffening is obtained by angle iron framing at 4-foot intervals. Longitudinal, inside standing seams at top stiffen and make erection easy.



Largest risers in the building are more than 6 feet wide and were constructed as shown in the sketch at the right. Inside, vertical standing seams were used here for stiffening. Risers were layed out so that sections run through the floor to make erection easier.



Stiffening is obtained by horizontal angle iron riveted around the risers (see photograph).

#### Insulation

Out from the equipment, on both supply and return lines, the mains are lined on the inside with sound absorbing material held to the metal by metal screws and large washers. To prevent heat loss or gain the mains in equipment rooms are also insulated with cork board held in place by banding steel, and finished with  $\frac{1}{2}$  inch asbestos cement and canvas. Construction of the ducts is identical with the description above.

#### Job Shop

To facilitate handling the 63,000 pounds of galvanized iron required in the job, Spencer Air Conditioning Company elected to equip a shop in the basement of the building. This location, it was believed, would save much time in getting

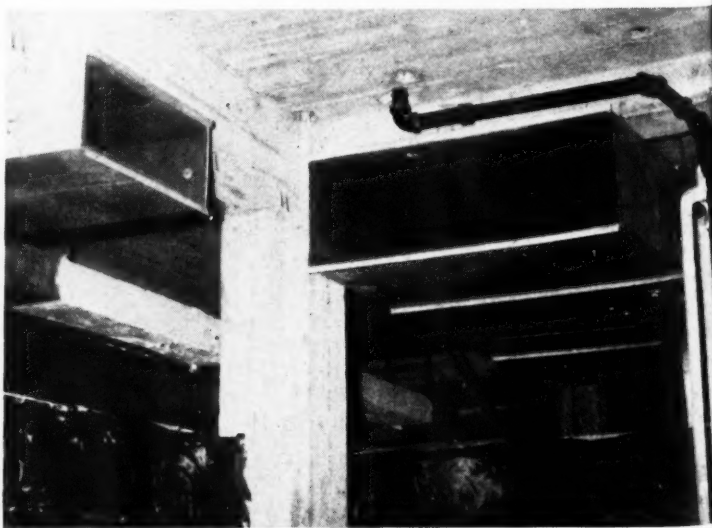
load, up to about 25 per cent outside air is planned.

#### Duct Details

Through the basement and third floor space large mains serve the numerous risers and drops. The construction of these ducts called for four pieces so put together that the top is self-stiffening by reason of two parallel, inside standing seams running lengthwise (see sketch). This practice eliminated troublesome angle stiffening and riveting in the tight space between the top of the duct and the underside of the concrete floor slabs. The side sheets are edged along the outside corners to take downward flanges of the bottom sheets. After insertion of the flange, the seam was hammered closed and buttoned.

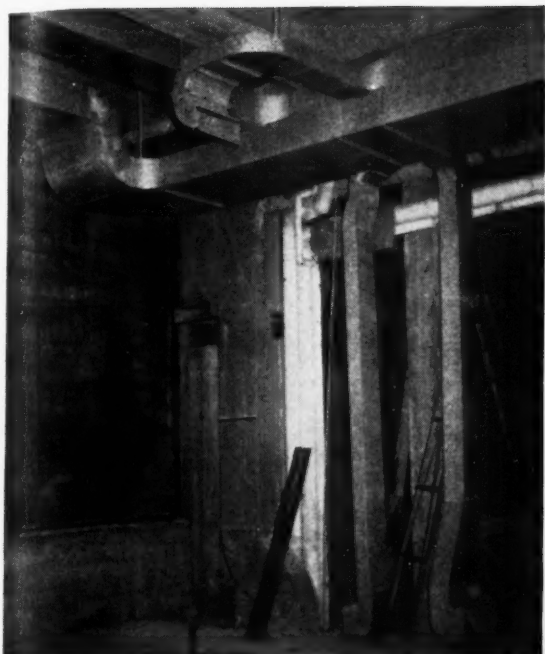
Side sheets were made in 8-foot lengths and were connected by flat drive cleats as shown. Bottom sheets were made in 30-inch lengths since these ducts are quite wide and were connected by standing seam drive cleats. Then, to obtain additional stiffening, angle iron was riveted to the sides and to the bottom at 4-foot intervals. The side sheet flat seams, the bottom sheet standing seams and the angle iron frames have no relationship to each other except that they do not coincide.

In several places large risers come up from the basement; risers up to 6 feet wide by 2 feet deep. These risers, like the horizontal ducts, were made from several pieces with the side sheets turned around both corners and flanged to form vertical, inside seams. The inside seams were closed and buttoned by a mechanic on the inside or, in smaller sizes in the shop before assembling.



Ducts out for several feet from each equipment room are lined with sound absorbing material to deaden all noise. The material was held to the sheets by metal screws through large washers.





Left—There was a great deal of small, complicated and twisted pipe work throughout this job. The job shop and job measurements as work went along eliminated much lost time. Center—Risers through the bank quarters are 24 feet long. Three 8-foot sections were put together on the floor and raised into the chases. Right—Ducts through halls were hung and then concealed by suspended ceilings.

job measurements to the shop crew. Due to conditions of construction, this procedure proved a wise choice and enabled sections to be altered from the original plan as required by structural changes and apparatus of other make.

A brake, a Pittsburgh lock forming machine, shears, and hand tools enabled the shop crew to keep up with installers. Fittings were laid out by the job foreman.

The mains and housings in the basement were

erected first, then large risers and bank quarter risers and then runs through the four floors were erected and connected to their respective units located on the third floor. One photograph shows the high risers in the banking room—these were made up in 8-foot sections and three sections were put together on the bank floor and raised in place as a unit. So far as possible, all duct work on a floor was fabricated and installed as one operation to minimize moving of the scaffolding.

## To Mark Miter On An Elbow (From Oxy-Acetylene Tips)

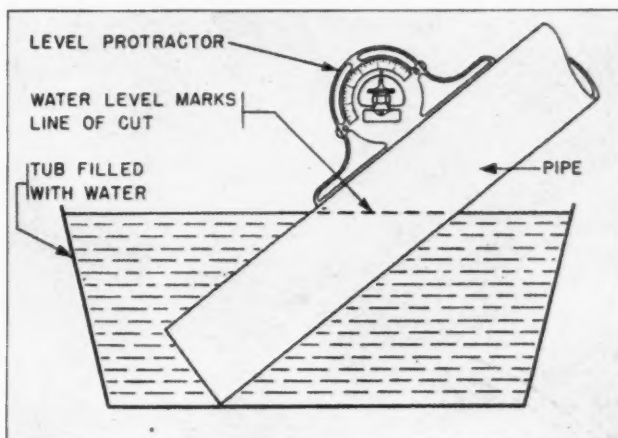
THERE is a remarkably easy way to mark the correct line of cut on pipe when making mitered joints for pipe elbows. Sole requirements are a tub of water and a level protractor.

Submerge the end of the pipe under water at one-half the desired angle of bend, using a level protractor. By marking the pipe at the water level with chalk or soapstone, the correct line of cut for that particular angle is readily indicated. If desired, a templet can be made for duplicating the cut on other pipe of the same diameter, by placing a piece of heavy paper squarely about the pipe, tracing the cut, and then cutting away the scrap portion of the paper to form a permanent templet.

In the example shown in the sketch, the pipe is inserted in the water at an angle of  $37\frac{1}{2}$  deg. which will give a two-piece mitered joint of 75 deg. If a bend consisting of more than two sections is desired, the correct angle of each cut re-

quired to arrive at the total angle of bend can be determined from the following equation:

$$\frac{\text{Total Angle of Bend}}{2 \times (\text{Number of Sections} - 1)} = \text{Angle of Cut}$$





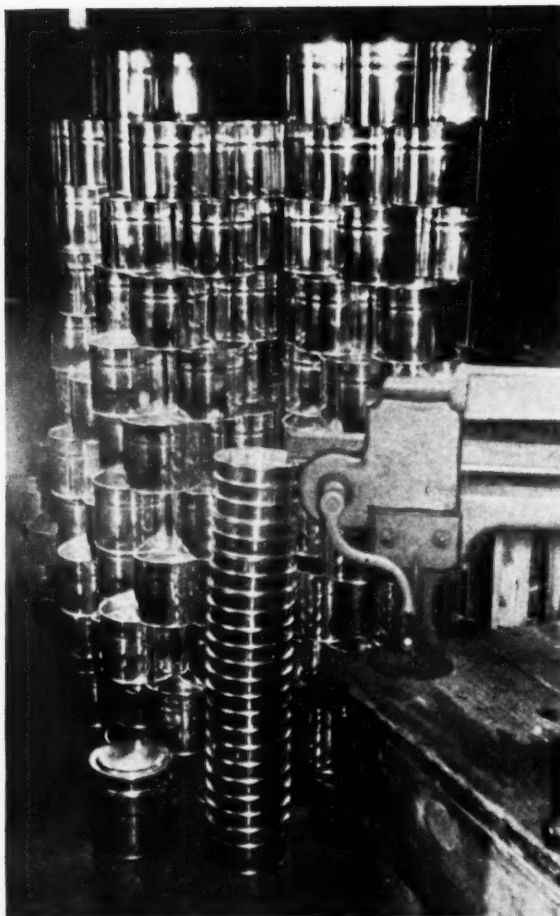


## Allred, Indianapolis, in 40 Years, Has Made 500,000 Miners' Dinner Pails

EVERY so often, in our field trips visiting contractors, there pops up a story so full of human interest that the urge to tell and show the story pictorially just won't be suppressed. The



The general form and construction of the miners' lunch bucket has changed practically not at all in the 40 years Allred has been manufacturing these tin pails.



In 40 years time Allred estimates some 500,000 pails have been made and shipped all over the world. Piles like this are almost always waiting final touches before packing and shipping.

story or the product may not add much to our useful fund of knowledge; there may be nothing in the operation which others can emulate; but, usually, the story makes interesting reading and reminds us how much this industry of ours contributes to the general well-being of American men and women.

The firm in point is Allred Manufacturing Company, Indianapolis, and its product is—miners' pails.

Allred—or the Sullivan-Gergen Company until 1924—has been making miners' pails for forty years. The same pail—same size; same design; same material; almost with the same machines and tools.

### 500,000 Pails in 40 Years

In that 40-year period, Allred and its predecessor, estimates that it has produced more than 500,000 pails—one half million "dinner pails"—almost one for every miner in the country.

These pails are sold to jobbers who distribute them through hardware stores, general stores in miners' villages, mine supply and company stores—through all the channels of distribution down to the cross roads store in the mountains. And these pails have gone far from home, to all countries in the Americas and even abroad.

Left—G. T. Reynolds superintendent forming a top in the simple bench press and die. One press and the top is ready to flange. Right—Bottom has been seamed into body and final touches are being put to body seam.



The pail has hardly been changed in forty years. Made of IX tin, in four and five quart size, the assembly is shown in the photographs. The four quart size has always been popular with copper miners—why, no one seems to know. The large, five-quart size is the coal miners' standby.

#### Bottom Section Construction

The photograph of a single pail shows the construction. The large bottom section is a single piece side with one vertical soldered seam to which the bottom is flat seamed and soldered. The body sheet is cut to size and folded for seaming along the vertical edge. The top edge is turned for wiring and wired and the side seam soldered. The bottom edge is turned out  $\frac{1}{8}$  inch on a small burring machine. The bottom is cut on a small circle shear and the edge burred for a flat seam. Final assembly slips the body edge into the bottom hem and closes the seam in the setting down

machine. The ears for the bale are riveted to the body.

#### Upper Body Construction

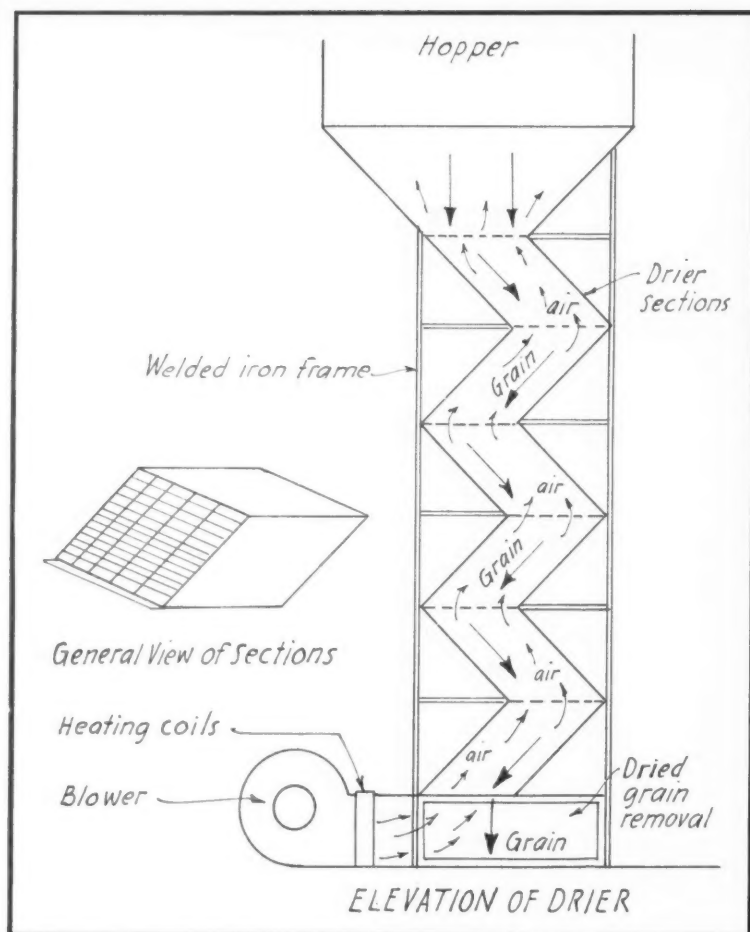
The flared upper section slips into the lower body. The diameter of the bottom of the upper section is smaller than the top so that the upper section slides into the lower body as far as the heavy bead. Construction is the same—flat seamed bottom, wired top, one vertical seam.

The top is raised slightly and to get this contour a special raising block is used under a shop-made press (see photograph). To the formed top a rim is soldered into a single, flat seam. The cover ring is riveted on.

G. T. Reynolds, superintendent of the shop (the man in the pictures), has been making these pails for twenty years and believes that by himself he has probably made complete pails or parts of at least 300,000 "dinner buckets."



Left the bale ears are riveted to the body. Right — The top, pressed in the die above, is flat flanged to the rim and a sweated seam run around the rim. In lower foreground is a top section showing the stiffening bead which also keeps the upper section from falling into the body.



Schematic diagram of drier showing relationship of sections, counter-flow of warm air and grain, welded supporting frame, hopper, and air heating unit. Details are not accurate.

FOR the purpose of drying wet grain, beans, corn, etc., the Glendon A. Richards Company of Grand Rapids, Michigan, is fabricating for the Wilson Dryer Company, Grand Rapids, a combination angle iron, galvanized iron, pressed board, wire screen, dryer of the type shown in the sketch and photographs.

Briefly the market for the sale of this dryer has developed because increased use of harvesting combines is bringing into the market immature, unripened, excessively moist grain. Also, hybrid seed corn frequently contains excess moisture and must be dried to commercial standards. Rice is being increasingly dried artificially. The Wilson company believes that within a short time a possible one-third of America's grain crop will be dried artificially.

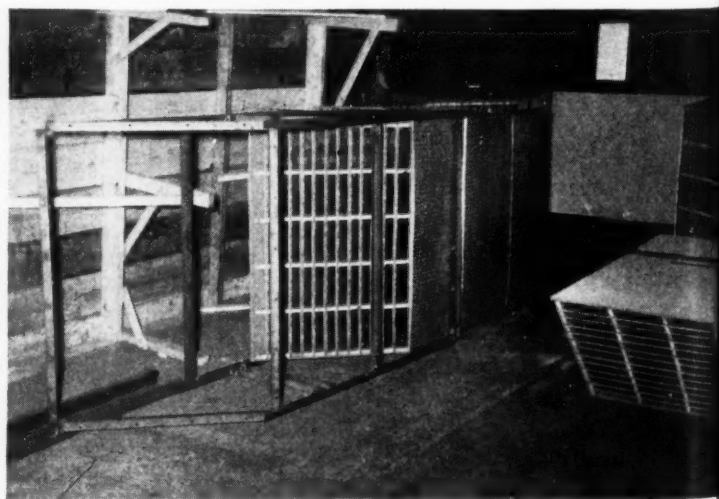
The three chief advantages made possible by artificial drying in the opinion of the Wilson company are—Wet grain can be bought cheaper and with drying costs added is still cheaper than naturally dried grain; Department of Agriculture records show 25 per cent of all grain is given a lower grading than necessary because of excess moisture; spoilage is markedly reduced.

## High Speed, Grain Drier For Unripened, Excessively Moist Grain

The warm air heating—sheet metal fabricating industry is finding itself increasingly involved in problems of drying materials and products with the variety of materials and products increasing each year. American Artisan, aware of this development, has published several articles—Package Coal, December, 1941; Paint, March, 1940; Paint, July, 1940; Seed Corn, September, October, November, 1938. This article covers another product—grain.

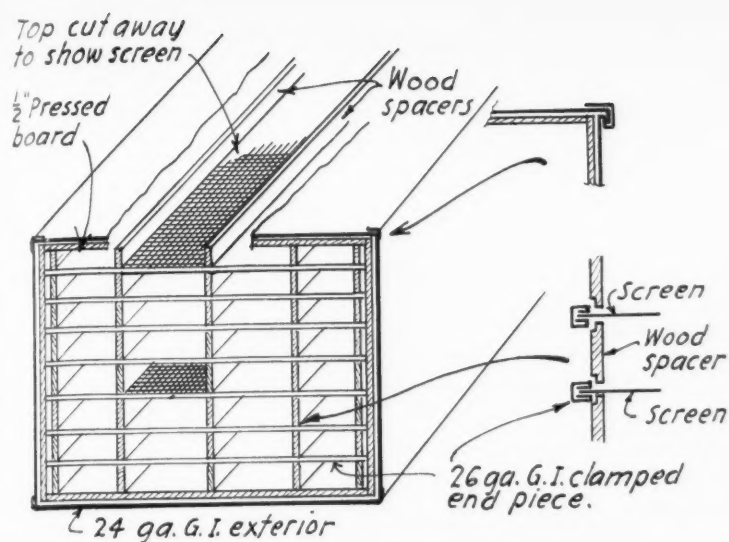
### Construction and Operation

The general construction and application of the Wilson dryer is shown in the installation sketch. The dryer is flexible and may consist of as many or as few sections as the grain handled requires. As fabricated in the Glendon A. Richards shop, each section is built up of pressed board sides with wood spacer bars holding to parallel spaces the wire screens over which grain and warm air counter-flow. The "heart" of each section is the multi-spaced channels through which grain and warm air flow counter to one another. The grain



Frame sections and drier sections of a partly completed installation showing how sections are placed in frame and appearance of sections as constructed. Compare with cross section above.





### CROSS SECTION OF DRIER SECTION

Cross section of a drier section showing wire screens, clips which hold wire stretched tightly in section, wood spacers and the pressed board and galvanized iron housing. Construction details are indicated.

flows down from bin to hopper while the warm air is forced upward in alternate channels from the heating coil and blower and is exhausted to the outside.

The partitions are made of close weave galvanized wire which is stretched end to end between clamped galvanized iron strips along each end. Wood partitions divide each channel into parallel spaces. These wood strips also serve to keep the screen equa-distant throughout the length of each channel. These wood spacers are also notched on each end to catch the galvanized iron strips and keep the screen taut.

The exterior of each section consists of 24-gauge galvanized iron sheets joined by Pittsburgh locks on all four corners.

For assembly in the field, the pressed board-wood-screen sections are housed in an angle iron with end frames shop-punched so that ends of

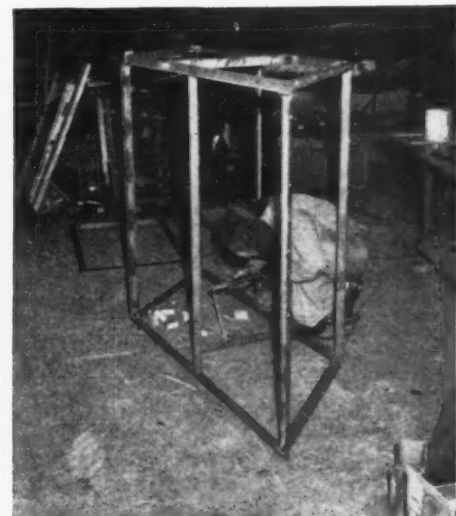
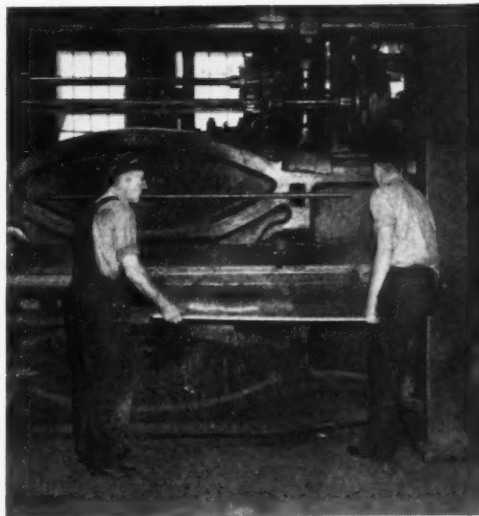
adjoining sections may be bolted together. Also for erection on the job, a complete angle iron frame is now being fabricated in sections so that, when erected, the individual dryer sections can be readily bolted into the supporting frame.

Hoppers are necessary to hold the wet grain at the top and the dried grain at the bottom. These hoppers are made up from black sheets of approximately 10 gauge, with punched holes for assembly and with each sheet cut to size. All hoppers are assembled in the shop to check fit before shipment. One photograph shows one hopper side being so assembled.

Glendon A. Richards Company has suggested numerous betterments in original construction as a result of experience in specialty fabrication. Formerly the sections were assembled in wood boxes—now the wire and pressed board sections are more rigid, lighter and easier to handle. Machines capable of forming heavy gauge material and an experienced welding department made these suggestions practicable. As now designed, production can be speeded up to keep pace with almost any increased sales program and the Richards Company has already completed several dozen complete units.

### Cover Picture

This month's cover photograph shows 14-gauge, galvanized iron smoke stacks being welded by mechanics of the Glendon A. Richards Co. There were 800 of these stacks—32 feet long, five sections in each—used in Camp Custer, Michigan's big army camp. A special expander was inserted during welding to keep the sections truly circular during welding. The longitudinal seam is butt welded. Inadvertantly, we said in our January, 1941 issue that these stacks were made by Michigan Sheet Metal Co., Lansing.



Left—Hoppers are cut, punched and assembled in the shop before shipping. Ten gauge, black iron sheets. Center—The galvanized iron clamping strips are inserted over the wire and clamped tight in the press. Right—Frame sections are cut and then put together by metallic arc welding. Side members are first placed in a bench jig to get an exact shape.

# Sizing Mains By The Steel Square—

## *To equal more than two branches*

By William Neubecker

Head Instructor  
Sheet Metal Department, New York Trade School

In the October issue Mr. Neubecker explained how to find diameter of a main pipe equal to the combined areas of two prongs, by use of the steel square. Mr. Neubecker stated that the same method can be used for any number of prongs and one reader asked how to do it. This article explains the method.

THIS method of using the steel square is based on the geometrical rule that the square root of the sum of the squares of base and altitude of a right angle triangle gives the true length of its hypotenuse.

It should be understood that it is only when the profiles or sections of the outlets of ducts, branches or offsets are either ROUND or SQUARE that the steel square methods can be employed.

In Fig. 1 is shown a three prong fitting whose sections at the outlets can either be round or square, of the dimensions as desired, in this case being 6,  $6\frac{3}{4}$  and  $7\frac{1}{4}$  inches respectively.

To find the size of the round or square main duct, proceed as follows: Set your measuring rule diagonally from 6 on the steel square to the opposite leg at  $6\frac{3}{4}$  and it will measure from *a* to *b*  $9\frac{1}{16}$  inches. This represents the size of the main duct, if only two prongs (6 and  $6\frac{3}{4}$ ) were used.

As there is a third prong of  $7\frac{1}{4}$  inches, then set your measuring rule from  $7\frac{1}{4}$  on one leg of the steel square to  $9\frac{1}{16}$  on the opposite leg, then *c* to *d* will measure  $11\frac{5}{8}$  inches, the size of the main duct having the combined areas of the three branches of 6- $6\frac{3}{4}$  and  $7\frac{1}{4}$  inches regardless of whether the prongs or main duct are to be round or square.

Proceed in this manner regardless of how many branches are taken from the main duct.

In addition to making the above request, our correspondent has submitted a sketch which has been reproduced in Fig 2 having three outlets namely 8 in. round; 7 in. square and 6 x 8 inch rectangle or any other dimensions and asks how the steel square can be employed to find the size

of the main duct in either round, square or rectangular dimensions, without using any mathematical computations.

As previously mentioned, the steel square can only be used when the ducts, branches or offsets are either square or round. When a problem arises as in Fig. 2, this can be solved without any mathematical computation whatever, by simply using a table of Diameters and Areas of Circles also a table of Square Root of Numbers, in the following manner:

The rectangular section of the first prong is  $6 \times 8$  which equals 48 sq in.; the second is 7 in. square and equals 49 sq. in.; the third is 8 in. round. Now consult a table of Diameters and Areas in which will be found that the area of 8 in. diameter will be 50.26 sq. in.  $50.26 + 49 + 48 = 147.26$  sq. in. say 148.

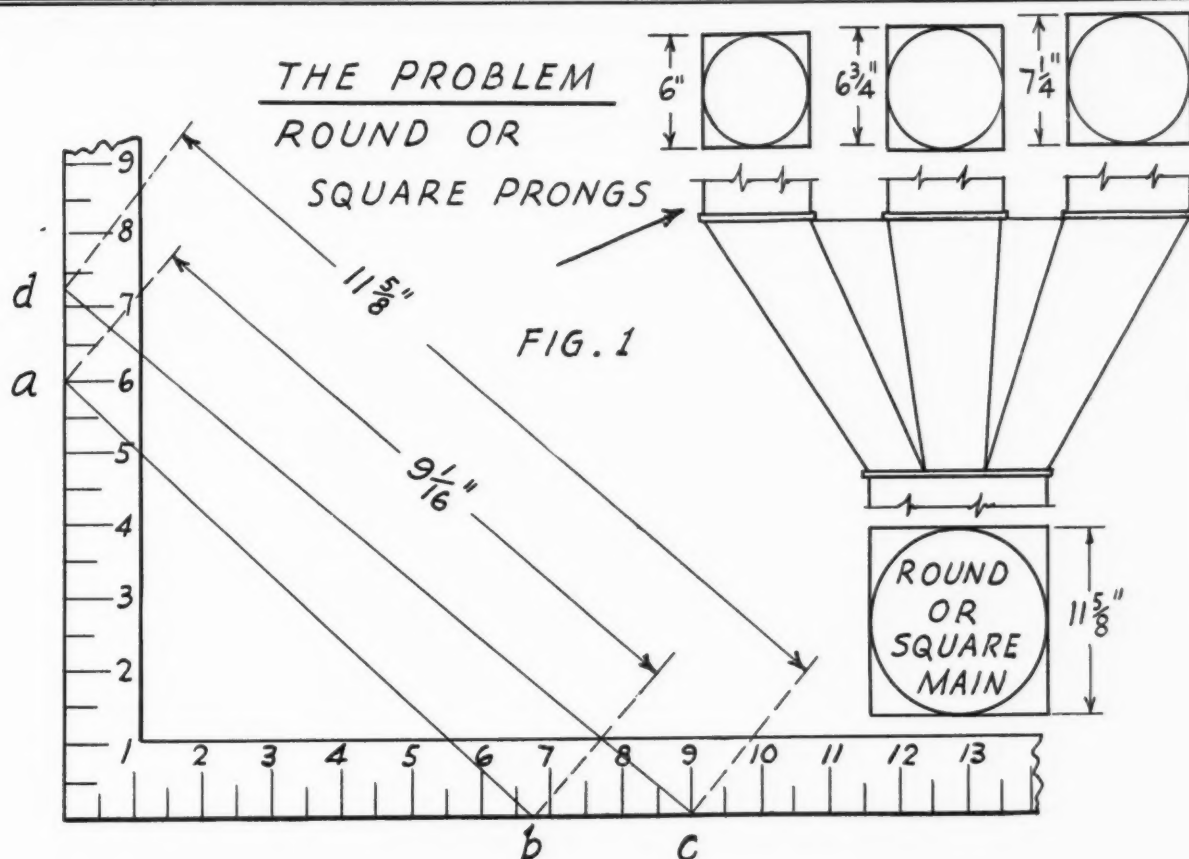
Now follow the column of areas to 148 which suggests a round main duct of  $13\frac{3}{4}$  in. diameter to have the combined area of the three prongs or branches.

Now if this main duct was to be of a square section, then follow the Square Root table along the column of NUMBERS to 147 which shows a square root of 12.12 for a square duct whose sides are  $12\frac{1}{8}$  in. Suppose the main duct was to be a rectangle whose given side was to be 8 in.; then simply divide the combined area of the

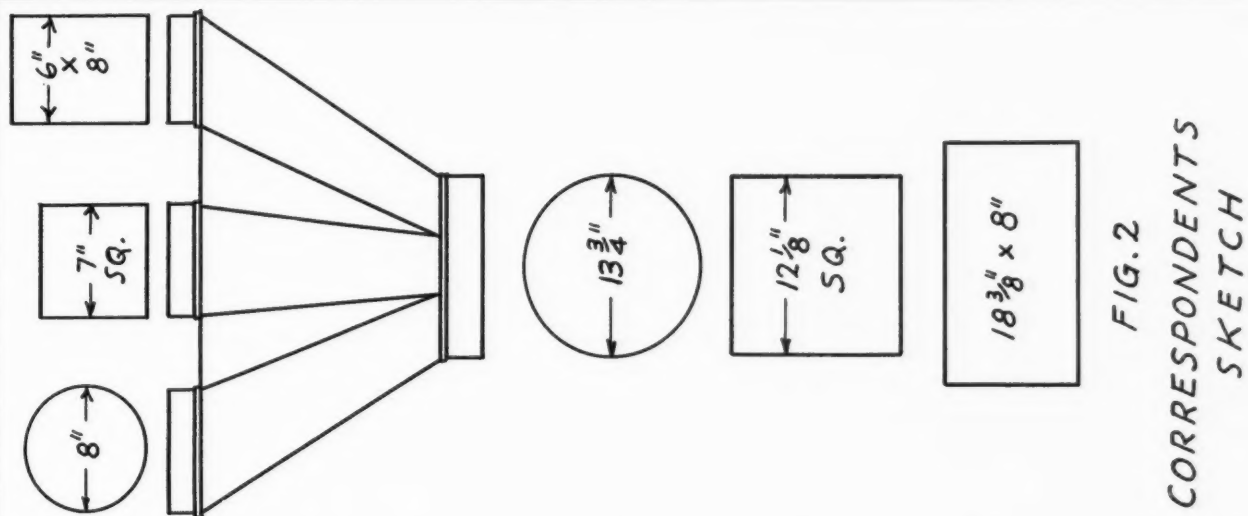
147  
three branches or  $\frac{147}{8} = 18\frac{3}{8}$ . The size of the  
8  
rectangular duct would be  $8 \times 18\frac{3}{8}$  in.

In this manner all computations are omitted by using the STEEL SQUARE for ROUND AND SQUARE SECTIONS and the TWO TABLES for IRREGULAR SECTIONS.

# THE STEEL SQUARE AS A LIGHTNING CALCULATOR FOR ROUND OR SQUARE DUCT WORK



COMPUTING THE AREAS WITHOUT MATHEMATICS  
FOR ROUND SQUARE OR RECTANGULAR BRANCHES  
CONNECTING TO EITHER RECTANGULAR SQUARE OR  
ROUND MAIN DUCT HAVING SIMILAR AREA BY  
MEANS OF STANDARD TABLES





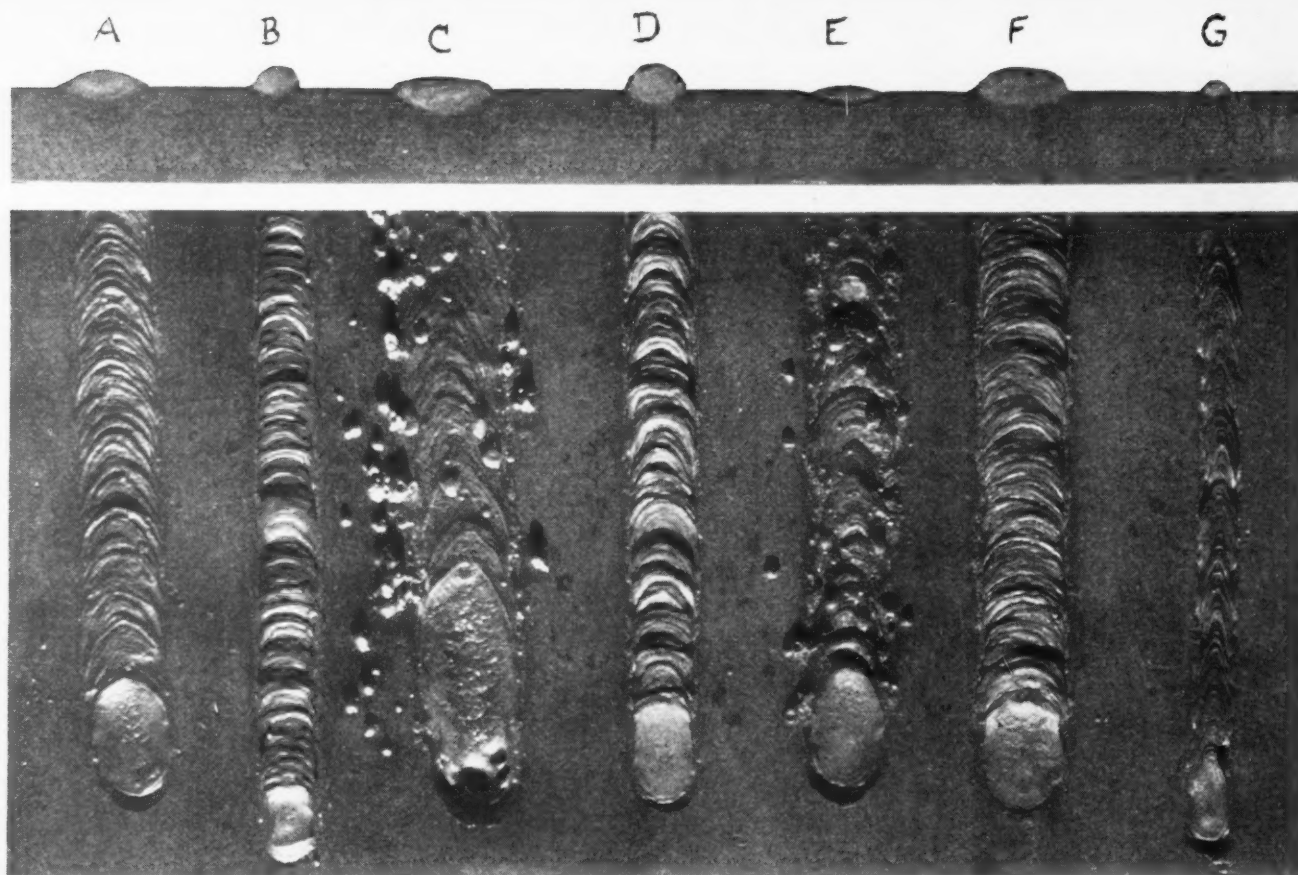


Fig. 4—Plain and elevation views of welds made with shielded arc electrode under various conditions. (A), current, voltage and speed normal; (B), current too low; (C), current too high; (D) voltage too low; (E), Voltage too high; (F), speed too low; (G) speed too high.

## Conservation of Welding Electrode Is Vital

By Clayton B. Herrick, Welding Engineer, Lincoln Electric Co.

**T**HE necessity of conserving materials in the war effort is no where more urgent than in the use of welding.

Welding is the key process which is making possible production of ships, planes, tanks and practically all other war equipment at the tremendous speeds which are vital to this country's speedy and complete victory.

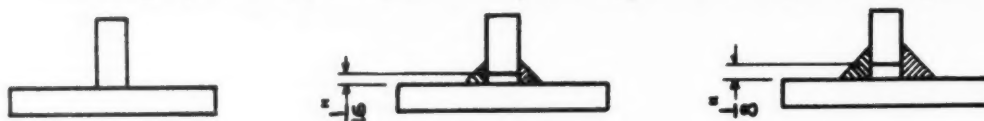
In order that welding may contribute its utmost potentiality in war production, it is important that welding materials be utilized to maximum advantage. This applies particularly to welding electrodes.

The electrode for welding is probably the most essential piece of war industry equipment today. It is the electrode which provides the metal of proper physical properties and operating characteristics permitting production of highest quality welds in minimum time and at minimum cost.

There are a considerable number of factors which affect the most efficient use of electrodes. If conscientiously controlled, these factors will contribute to best use of welding in the war effort. The result will be a fast rate of production by the use of welding and full utilization of the materials which welding equipment manufactur-

### CONSERVATION OF WELDING ELECTRODE

**FIT-UP OF JOINT:**—Improper gap in plates to be joined makes a difference of .18 and .40 pounds of metal per foot of joint respectively for separations of  $\frac{1}{16}$ -inch, (at center), and  $\frac{1}{8}$ -inch, (at right). With proper fit-up, (at left), metal deposited per foot of joint is .40-pound.

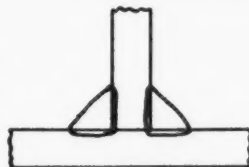


COURTESY THE LINCOLN ELECTRIC COMPANY

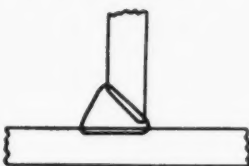
# CONSERVATION OF WELDING ELECTRODE

**TYPE OF JOINT:**—Proper joint to select is the one which meets service requirements and costs the least. Obviously, if requirements are met by the simpler type of joint, which requires less machining and less electrode, it is a waste of time, labor and materials to use a more complicated type.

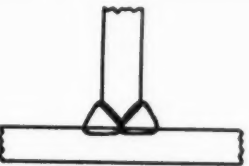
## TEE JOINTS



**6. PLAIN FILLET WELDED TEE JOINT.** May be used for all ordinary plate sizes. No machining of plates. Most satisfactory when welds are in longitudinal shear. For welds heavily loaded transversely by fatigue or severe impact, use with caution.



**7. SINGLE V TEE JOINT.** This is better than (6). For work welded from one side. Generally used on  $\frac{1}{2}$ " plates or lighter. Costs more for joint preparation but uses less electrode than (6). For more severe load conditions as outlined in (6).



**8. DOUBLE V TEE JOINT.** Used for heavy plates. Welded from both sides. Uses less electrode than (6). May be used for severe longitudinal or transverse loads of all kinds.

**14. SINGLE BEAD LAP JOINT.** May be used for all sizes of plates where joints are not subject to excessive fatigue or high impact loads.

## BUTT JOINTS



**1. PLAIN BUTT JOINT.** Largely used on plates up to  $\frac{3}{4}$ " thick with metal electrode  $\frac{1}{4}$ " with carbon electrode, although generally used below this. Inexpensive as to preparation of joint. Suitable for all usual load conditions if full penetration is secured.



**2. SINGLE V BUTT JOINT.** Used largely for  $\frac{3}{4}$ " plate or thicker. Scarfing and machining costs more than (1) and more electrode used than in (1). Used generally on plates thicker than in (1). Meets all general or usual load conditions.



**3. DOUBLE V BUTT JOINT.** The cost of machining is greater but less weld metal is used than in (2). Cost of machining and welding should be balanced against each other. Used largely for  $\frac{1}{2}$ " and heavier, and for all usual loads. (Note that joint is welded from both sides.)

## CORNER JOINTS



**11. FLUSH CORNER JOINT.** Generally used for 12 gauge and lighter. May be used for heavier plates with caution. Not for very severe loads on heavier plate.



**13. FULL OPEN CORNER JOINT.** Used for all plate thickness when welds can be made from both sides. May be used under severe load conditions, for maximum strength.



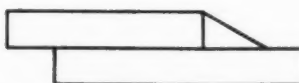
**12. HALF OPEN CORNER JOINT.** Generally used for 12 gauge or heavier, where welded from one side only. "Shouldering" effect reduces probability of burning-through and makes for easy welding. May be used for ordinary loads, but with caution for fatigue or impact loads.

## EDGE JOINT



**16. EDGE JOINT.** Generally used for  $\frac{1}{4}$ " or thinner. Not recommended for heavier work. For loads which are not very severe.

## LAP JOINTS



**15. DOUBLE BEAD LAP JOINT.** Better than (14). May be used for load conditions, more severe than single bead lap joint. Beads should be full-size, and joints may be loaded much more severely than (14). The butt joint (1-5) is the best joint for very severe service but of course is more expensive.

Fig. 1—Drawing showing the 12 types of welded joints.

ers are producing at peak capacity.

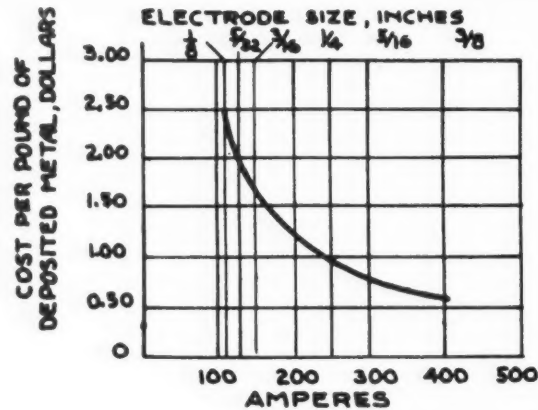
The factors which have an important bearing on this situation follow:

1. *Select the Right Type of Joint and Be Careful of Fit-Up:* There is a type of joint (see Fig. 1), best suited to the particular job. A serious disadvantage in waste of weld metal results by using a complicated joint where the more simple type of connection will suffice. Since the type of joint greatly affects the amount of metal required, it is suggested that a study be made to make sure the joint is proper for the particular application. Obviously, the joint to select is the one which meets requirements at the greatest speed and the lowest cost.

Joints and their fit-up should be given most

careful consideration, as fit-up affects not only the cost of the welded joints as such, but also the performance of the finished product. As an illustration of the effect upon cost in a very simple fit-up, notice the case shown in Fig. 2 where there is shown a T-weld with  $\frac{1}{4}$ -inch plates. Assume that the cost of deposited metal is \$1.00 per pound. Then if the joint is properly fitted up, the cost per foot of joint (two beads), would be \$0.40. If, however, there is a gap between the vertical plate and the horizontal plate of  $\frac{1}{16}$ -inch, the cost is increased to \$0.58 per foot. If the gap is  $\frac{1}{8}$ -inch, the cost is increased to \$0.80 per foot, resulting in a difference of \$0.18 to \$0.40 for  $\frac{1}{16}$ -inch and  $\frac{1}{8}$ -inch respectively. Obviously money spent in obtaining good fit-up is

# CONSERVATION OF WELDING ELECTRODE



**ELECTRODE SIZE :-** Effect of electrode size on economy is shown in the chart at left and table below. Note how the cost of welding goes down as electrode size goes up. Note, also, electrode consumption rate, pounds of electrode deposited per hour, number of stub ends, (indicated by interruptions per pound consumed), and cost of interruptions to change electrodes.

EFFECT OF CHANGING ELECTRODE SIZE						
ELECTRODE SIZE	1/8	5/32	3/16	1/4	5/16	3/8
AMPERES	110	130	150	250	325	425
ARC VOLTS	24	25	26	30	34	38
K.W. AT ARC	2.64	3.25	3.9	7.5	11.1	16.1
CONSUMPTION RATE, LBS. PER HR.	2.6	3.3	3.95	7.5	10.7	16.2
DEPOSIT, LBS. PER HR. (50% OPERATING FACTOR)	0.87	1.1	1.32	2.5	3.57	5.4
EFFICIENCY OF SET (%)	47	50	51	55	59	59
KILOWATT INPUT	5.6	6.5	7.65	13.65	18.8	27.3
INTERRUPTIONS PER LB. CONSUMED	18	12	8	5	3	2
COST PER POUND DEPOSITED						
LABOR	\$1.150	\$0.909	\$0.758	\$0.400	\$0.280	\$0.185
OVERHEAD	1.150	.909	.758	.400	.280	.185
POWER	.064	.059	.058	.055	.053	.051
ELECTRODE	.150	.135	.127	.127	.127	.127
COST OF INTERRUPTION (INCLUDING OVERHEAD)	.050	.033	.022	.014	.008	.005
	\$2.564	\$2.045	\$1.723	\$0.996	\$0.748	\$0.553

COURTESY THE LINCOLN ELECTRIC COMPANY

Fig. 3—Chart and table showing affect of electrode size on welding economy.

readily saved in welding.

2. *Choose the Correct Type of Electrode:* While the general purpose electrode will produce satisfactory welds under virtually every condition, special electrodes (for example heavily coated, fast flowing types) may prove more efficient. The electrode should be chosen with respect to: (a), physical properties required; (b), type of joint; (c), position of welding (flat, vertical, overhead or horizontal), and (d), condition of fit-up of the work. Recommendations of the equipment manufacturer should be considered.

3. *Use an Electrode Which Has and Maintains a Uniform Coating:* The electrode coating, if not correct, will cause rejects not only of the electrodes themselves but possibly of the welds produced by their use. It should be remembered that the coating not only produces the protecting shield but it also controls: (1), fluidity of the metal; (2), penetration; (3), shape of the beads; (4), physical properties of the deposit; and (5), composition of the deposit.

4. *Use Electrodes Which Provide Proper Physical Properties:* Electrodes manufactured today are clearly described by the manufacturer in respect to the quality of weld they will produce. Required physical properties of the work at hand

should be known and the electrode should be selected to meet these requirements.

5. *Use Fast Flowing Electrodes Wherever Possible:* Certain electrodes are manufactured today to permit the fastest possible welding under specified conditions. It is obvious, therefore, that electrode and time will be saved if these fast flowing types are used wherever practical.

6. *Select an Electrode Which Keeps Splatter and Slag Loss at a Minimum:* Since all splatter is a waste of weld metal, the importance of this is obvious. It should be realized that the splatter loss of the electrodes vary and care should be taken to avoid use of those which have excessive losses.

7. *Wherever Possible Use Electrodes Which Produce Flat Beads:* It is a waste of welding electrode to deposit any more metal than is required. Not only is the welding electrode itself wasted but useless time is required to remove the excess metal from the welded joint.

8. *Select the Right Size Electrode:* The largest diameter electrode which can be used effectively is the best from the standpoint of electrode conservation. The saving runs up to 40 per cent per pound deposited, for example, when 1/4-inch is used instead of 3/16-inch. (See Fig. 3.)

(Continued on page 72)



# How to Store Galvanized Sheets To Prevent Discoloration

**W**ITH galvanized iron sheets difficult to get and with everyone desirous of preserving sheets in first class condition, the problem of properly storing sheets to avoid discoloration becomes of interest to the trade.

Recently a reader, Morris and Riley of Carlisle, Pennsylvania, wrote that they store sheets in an

unheated room laying the sheets flat in racks and asking if storage on edge would better prevent discoloration.

To furnish an answer in keeping with present thinking on the subject American Artisan addressed an inquiry to various mills and associations. Following are the suggestions received:

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## American Zinc Institute

**W**E DO not have a booklet on the subject of storing galvanized sheets to prevent discoloration, but we have always emphasized the necessity for proper storage in all our oral presentations and discussions and have also given it special emphasis on page 2 of our leaflet "Directions for Laying Galvanized Roofing."

We are of the opinion that too much emphasis can not be placed upon the matter of proper storage. There has been an almost endless number of cases in which sheets have been damaged by the formation of so-called "white rust," commonly resulting from improper storage. It would seem that manufacturers of galvanized sheets should have kept their dealers properly informed on this matter but so far as we know, no manufacturer ever made a systematic attempt to pass this information out to distributors and dealers, until the Zinc Institute began to agitate the matter. At the present time several companies are now making special efforts along this line.

We note that your reader is considering re-arranging the sheet storage racks so that the sheets may stand on their sides. This probably will be all right if pains are taken to see that the bundles of sheets are opened up and that when the sheets are stored, the individual sheets are kept separated sufficiently far so that free circulation of air around them may be accomplished. With flat sheets, there is a tendency for the sheets to cling together even when they are standing on edge and it is absolutely necessary, if successful storage is to be accomplished, that care be taken to see that the sheets really are separated.

## Berger Manufacturing Division Republic Steel Corporation

**W**E HAVE done considerable experimenting from time to time in storage of sheets, and find that the best way to store sheets is to build a horse arrangement with a well anchored center into the floor. This horse would be in the shape of an A, and the sheets would lean against each side of it. It is well to have a post right up through the center of the horse and have it anchored deep in the concrete so that it doesn't slide when the weight becomes balanced on either side. In this way, the water will drain off the

sheets if you do have condensation and it is fairly economical from a space-saving standpoint.

The only other method, of course, would be to continue the racks and put in heat, keeping temperature so that it does not drop below 40° at any time and so there are no sudden changes of temperature in the warehouse. Ample ventilation from the lower levels in the warehouse to the roof are also helpful.

## Carnegie-Illinois Steel Corporation

**W**HEN stocking galvanized sheets under conditions where condensation, or to use a more common expression, "sweating," cannot be avoided, it is our experience that the possibility of damage can be reduced by storing flat sheets on edge and corrugated sheets on end.

This, however, will not eliminate stains or discoloration, and the only way that such damage can be prevented is to store the sheets in a heated warehouse where a uniform temperature can be maintained.

## Continental Steel Corporation

**W**E KNOW of no method of stocking galvanized sheets so they will not become discolored after a considerable time in storage.

In the warehouse we stock the sheets piled flat keeping the edges even so one sheet does not project beyond the other. If the sheets are allowed to project the edges become discolored very rapidly.

Some consumer warehouses have the practice of piling sheets as received into the same rack. The latest shipment is always on top by this method and the stock in the bottom of the rack may be from several months to a year or more old, and naturally become discolored.

Other warehouses and fabricators use the double pile system, using up the older pile first, and in case a third shipment of a given size and gauge is received the oldest pile is transferred to the top of the second shipment and the third shipment is piled by itself. This method, while it involves some handling at times, does keep the oldest stock moving first.

Zinc is a metal that tarnishes very readily upon exposure to the atmosphere. We have found the flat piling with edges and ends kept even the best way to handle the material.

There might be less tendency to "sweat" and "white

rust" if the sheets were stocked on edge, especially if the warehouse is damp or subject to sudden temperature changes.

On the other hand, the chances for atmospheric discoloration will be increased as the sheets so stored will not pack as closely and the circulation of air between the sheets will be greater.

### Granite City Steel Company

**I**T IS true that galvanized sheets will become discolored if they are stored where even very slight amounts of moisture can come in contact with the zinc surface. This discoloration generally looks either brown or light blue, depending upon which way the light reflects from the sheet. Of course, if the sheets are allowed to become very wet and are piled in storage the corrosion will be much more severe and form a heavy white deposit of zinc carbonate.

We believe the best way to prevent the discoloration is to keep the sheets dry and piled so that air can circulate between them. This can be accomplished by keeping the sheets piled on edge and separated by wires or thin sticks of wood.

### Superior Sheet Steel Company

**I**N THE opinion of our Chief Metallurgist, it is quite difficult to recommend any standard practice or method. The location of the warehouse, condition of the building, climatic conditions or temperature changes all are apt to have an effect on the appearance of sheets stored for any length of time. It is even possible that something peculiar in a producer's Galvanizing method may cause a shipment of Galvanized Sheets to discolor more readily than others, regardless

of how carefully they are stored. Piling the sheets in racks or standing them on edge would not make any difference.

The main requisite seems to be a warm, well ventilated and dry warehouse.

### Youngstown Sheet and Tube Company

**I**T HAS been our experience that the only way possible to store galvanized sheets in a warehouse without having the sheets become discolored, is to maintain a warm dry atmosphere in order to minimize the possibility of condensation of moisture from the atmosphere onto the sheets.

The discoloration on zinc coated material is due primarily to oxidation of the zinc which is accelerated by moisture, so that the logical remedy is to keep the material at a temperature that will prevent the moisture from accumulating on it.

We have seen equally good results with sheets piled flat, and sheets piled on edge, where the atmospheric conditions were right and have also seen equally bad results on sheets piled either way when the atmospheric conditions were wrong.

There are several methods in vogue for chemically treating the surface of a galvanized sheet to prevent or retard corrosion, but these in the long run are usually more expensive than it would be to provide the proper warehousing conditions. Some of these are as follows:

1. A phosphoric acid treatment producing a zinc phosphate surface.
2. A zinc chromate coating.
3. Light coating of lacquer.

We could hardly recommend any, unless it would be the last, that might answer this particular inquiry.

## Conservation of Welding Electrode

(Continued from page 70)

**9. Use Long Electrodes in the Larger Size:** The obvious result is the reduction in the number of stub ends and in the time saved by eliminating interruptions to change rods. The 18-inch length should be used in 1/4-inch and larger sizes.

**10. Do Not Bend Electrodes:** This generally unnecessary habit will waste from 1/4- to 1/3 of the electrodes. Use electrodes straight and get the maximum of deposited weld metal from each rod.

**11. Use Proper Voltage and Current Settings:** Every electrode manufactured is designed to operate at a certain voltage and within a specified current range. If current is too high or too low, it will manifest itself either in excessive splatter loss or inferior welds (see Fig. 4), having improper fusion and penetration.

**12. Follow the Procedure Specified for the Electrode:** Accompanying each different electrode manufactured are detailed specifications regarding procedures to be followed. These specifications have been prepared carefully by the electrode manufacturer and, if followed consistently will prevent waste of electrode and assure high quality welding.

**13. Avoid Using an Excessive Number of**

**Beads:** If one bead of weld metal will meet design requirements, it is obviously a waste of electrode to add additional beads. This same applies to applications where two beads suffice. Additional beads are simply a useless waste of electrode.

**14. Use Electrode Down to Minimum Stub End:** Remember that the electrode can be used the entire length of its coated surface. Leaving any more than a minimum stub end is an obvious waste. By using care in gripping the electrode at its extreme end in the holder and burning it down to the maximum extent, the operator is rendering a patriotic service in saving electrode. Just 1/2-inch difference in stub end saves 3 1/2 per cent on an 18-inch length rod.

**15. Collect and Save Stub Ends of Electrode:** At the rate in which welding is being used today in war production, the amount of metal which would be wasted by failure to save stub ends would be tremendous. The average stub end is 2 inches long and this length multiplied by the millions of electrodes used, would constitute the great loss.

**16. Use Modern High Capacity Welding Generator:** Welding generators manufactured today have much higher capacity and much greater efficiency. For example, a modern 40-volt generator was shown to produce 7.7 inches of joint per electrode as against 6.6 inches for an older machine.



**Scully  
Service**

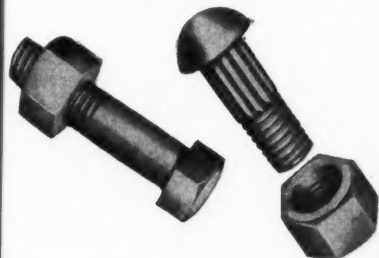
Structural material  
Plates, various qualities  
Floor Plates  
Sheets: Hot Rolled, Cold Rolled,  
Galvanized, etc.  
Bars (all shapes): Hot Rolled,  
Carbon and Alloy grades  
Hot Rolled Strip Steel  
Spring Steel · Tool Steel  
Drill Rod  
Cold Finished Bars, Carbon and  
Alloy grades  
Wire  
COR-TEN and MAN-TEN Shapes,  
Sheets and Plates  
Abrasion-Resisting Sheets and  
Plates  
Eaves Trough, Conductor Pipe  
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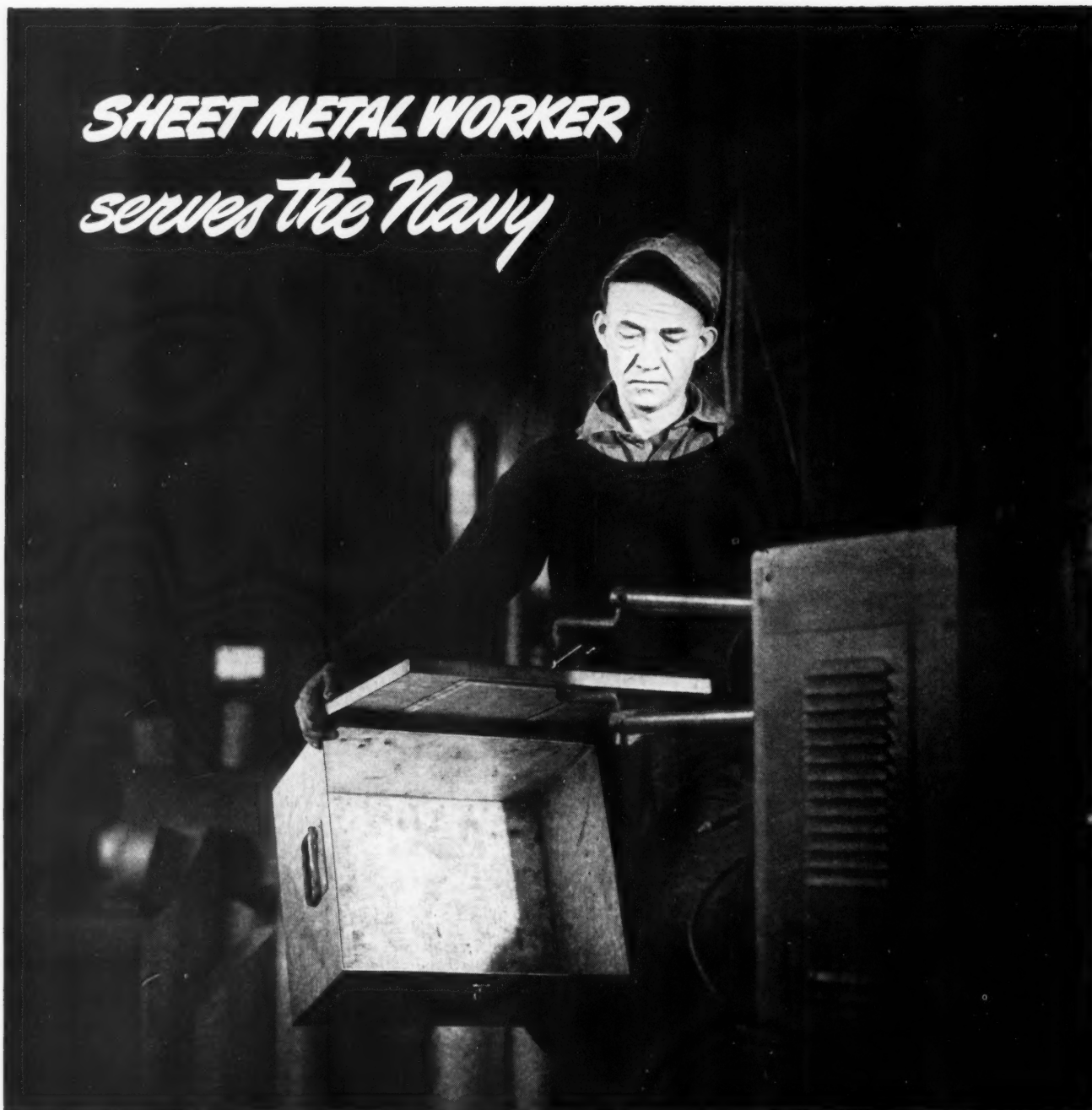
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## *SHEET METAL WORKER serves the Navy*



### WITH BETHLEHEM GALVANIZED PRODUCTS

There's a lot of work to be done on war production that's right up the wide-awake sheet-metal contractor's alley. Here's a case in point: the contractor, a medium-sized one in a small town, previously specialized in repair work, but now is engaged exclusively on war work. Illustration shows final spot-welding operation on a spare-part box, one of several hundred similar units recently completed on subcon-

tract for the U. S. Navy. Other "bits and pieces" on hand include several dust-collecting systems for nearby war plants. This contractor's change-over to war production has been achieved with no additional tooling and no new equipment. No new material either, for he's found that reliable Bethlehem Galvanized Steel Sheets make the grade on war work just as consistently as they've always done on repair work.



## BETHLEHEM STEEL COMPANY



Speakers and committee members reporting, left to right—Walter F. Simon, Supervisor of Apprentices, Wisconsin Industrial Commission; association secretary Paul F. Biersach; Apprenticeship Committee chairman, Frank Kramer; C. N. Nessell of Minneapolis Honeywell Co.

## Wisconsin "Pulls" Over 500 Conventioneers

**T**HE 28th annual convention of the Sheet Metal Contractors Association of Wisconsin was one of the best attended meetings in many years with approximately 380 registrations from Milwaukee and more than 180 registrations from out of town. Several manufacturers exhibited equipment and products, and, as usual, a hospitality room paid for by contributions from manufacturers, jobbers and salesmen provided a meeting place between sessions.

### Prepare Now for Post-War Business

Opening the program of addresses, A. G. Bryant of the Bryant Machinery and Engineering Company, Chicago, pointed out that this is indeed a war of survival of the fittest and best prepared; that for every man in the front lines we will require 18 men in production; that the cost of the war will be beyond comprehension; that before the war is ended almost every manufacturing plant or shop in the country must contribute its share of products; that this country for the first time is learning geography in our lessons of scarce materials; and that we will see the job done.

Also of concern now is what will happen after the war. Said Mr. Bryant, "What will our returning soldiers think if we give them after the war only a vast debt, widespread unemployment, falling prices, and a general depression. We believe that new discoveries being made today must be translated into peace activities. If we plan now for the postwar period, we can have not only business as usual, but business better than usual."

### Pool for Merrimac Job

Mayor Carl F. Zeidler, in welcoming the convention to Milwaukee called attention to the gigantic armament plant at Merrimac, Wisconsin, which involves several million dollars worth of outside corrugated galvanized iron sheeting in addition to much inside duct work and also several hundred small defense workers' houses. This work should be kept in Wisconsin and done by Wisconsin contractors, and since the program is so enormous, he suggested that contractors pool their personnel and bid in the job as a pool if this can be done. The mayor said he believed labor would cooperate in this effort and since the job is rush, the Wisconsin association appointed a committee to investigate the possibilities of a pool bid.

### Social Security

K. A. Albrecht of the Social Security Board described briefly some of the amended provisions of the old age and survivors act under which the employer is contributing one percent and the employee one percent of his wages for old age retirement benefit. Mr. Albrecht pointed out the importance of keeping records by account number because there are so many individuals with the same name, also manufacturers should render to the employee one full accounting each year or oftener if possible. As to future income under the retirement plan, the minimum will be \$10 and the maximum \$85 per month, but the \$85 payment is almost impossible to get for any present worker; \$46 per month per individual will be about the average payment. Mr. Albrecht reported there is now approximately two and one-half billion dollars in the Federal trust fund.

In answer to questions, Mr. Albrecht declared that corporation officers properly entered by account number can qualify for old age benefits, but in a partnership or a sole-ownership firm at the present time the owners are not qualified.

### Wages and Hour Law

Some features of the wage and hours act were presented by Thomas O'Malley, regional director, Chicago, who reviewed the history of the act since its passage in 1938 and declared the law was passed to eliminate certain un-American working conditions such as \$3 to \$4 a week wages; 60 to 80 hours per week of work; and a general lack of any unemployment insurance. The Warm Air Heating and Sheet Metal Industry, said Mr. O'Malley, has probably never paid the 30 cents minimum wage, particularly those shops employing union mechanics, but we did work longer than the 40 hour week.

This law, declared the speaker, has served to level out all wage payments so that the competitors now pay approximately the same wage rate. At the present time, explained Mr. O'Malley, outside salesmen, local store retail clerks, farm workers are exempted from the act, but these classifications may be included later on. Today there are a few violations of the minimum wage scale, but still violations of the maximum hours per week of work. The small firm doing only installation of furnaces locally is not covered by the act, but



Upper row, left—men active in apprenticeship affairs—left to right—J. W. Birthrong; B. Osmanski; A. Walters; R. V. Mundigler; Norwin Rogers; Walter Marth; E. F. Arndt; Walter Arndt. Upper, right—Ray J. Schneiberg, Badger Mfg. Co.; H. G. Sell and F. R. Anderson of Sall Mountain Co. Second Row, Left—Oscar Hoffman; Wm. Hielscher; Frank Kramer. Second Row, Right—Oliver Gedeist, Federal Bldg. Products Co.; Mrs. and Mr. A. R. Harris; Louis Stefanik; George Barschewski. Third Row, Left—Gene Ziebold, Cook Electric Co.; Oliver Gedeist; J. E. Waldron of Minneapolis. Third Row, Right—Dan Quinnan of Fireline shows his display to W. A. Rucks, E. J. MacIntyre and Reid Mackin, International Heater Co. Bottom Row, Left—John B. Wallig, Otto Ziebarth, Fred R. Voight, A. J. Stieglitz. Bottom, Right—Silas V. Moote of Industrial Commission; John F. Klatt, Local 24, representative; Norwin Rogers of Milwaukee Vocational School look on drafting work of student Ed. Petzko.

if the same firm installs the sheet metal work for a factory which is in interstate commerce, then, for that period, the firm becomes liable under the law.

In answer to questions regarding wage rates and

hours per week for apprentices, Mr. O'Malley said that if the apprentice attends school at the suggestion of the employer, then he should qualify for time and one-half beyond the 40-hours per week which he works



in the shop. On the question of the piece work operations, Mr. O'Malley declared that piece work qualifies in that the average weekly income and the average hours per week were translated into terms of wages per hour and hours per week and beyond 40 hours per week must be paid as time and one-half and above the minimum wage.

### Washington Regulations

Some of the ramifications of the Washington situation, as they affect our industry, were vividly described by C. N. Nessel of the Minneapolis-Honeywell Regulator Company. Much of the confusion, said Mr. Nessel, results from the fact that we have a war to win and everyone in Washington is insisting on winning the war as quickly as possible. Therefore, if some Washington regulations seem to be a little rough on our industry, we should remember that everything in American economy today is or will be submerged to the general proposition of winning this war.

The priorities and material situation is complicated, explained Mr. Nessel, by the fact that Army, Navy, Maritime Commission, operate under A-1 rating, in other words the highest possible rating, and even A-3, A-4 and A-5 ratings which seem pretty good to the contractor accustomed to receiving A-10 rating will not obtain material when these ratings conflict with army and navy A-1. For the contractor with an A-3 or lesser rating unable to obtain certain materials necessary to complete an order, Mr. Nessel suggested applying under PD-1 form for assistance. The speaker then described the general preference orders, the conservation orders, the limitations orders, and how these regulations operate on raw materials to finished products and from finished products back to raw materials.

On the more optimistic side Mr. Nessel briefly sketched the many defense housing projects now under way or contemplated in practically every state in the country. Also the many privately financed housing projects which are being proposed by Washington. Whereas in publicly financed housing government procurement probably will furnish the furnaces, contractors can still furnish labor and material and Mr. Nessel said he thought generally speaking profits were pretty good on this type of contract. For the privately financed housing projects the contractor still furnishes all apparatus, equipment, materials and labor and the government expects private financing to furnish at

least 400,000 units in 1942 as compared with approximately 120,000 publicly financed units. Mr. Nessel said he believed a domestic maintenance order is being written and probably will be released some time.

### Our Defense Problem

Some general aspects of our national defense program were described by C. H. Hall, district manager of the Johns-Manville Company, Chicago, also representing the National Manufacturers Association. Today, said Mr. Hall, defending our American way of life must include watching destruction from within as well as destruction from without because certain trends in government if not controlled can lead to greater disruption of our economy than anything we need to fear from without. Our American way of life is anchored in our desire to be free, to have a free press, to be free to think and speak as we please, and to worship and pursue our business as we wish so long as this does not jeopardize our neighbor. America has reached its present state through permitting free operation of business and our private economy is in direct opposition to government control, government cartels, and government ownership. Is our American way of life in jeopardy? Yes, said Mr. Hall, not from forces without, but from a minority who would trade free enterprise for a completely controlled economy and by another minority who would greatly modify our private enterprise system. Business men are willing to accept restraints during war, but we want these restraints to be temporary and we want to return to private enterprise as soon as possible. Only if every man in business preaches the gospel of private enterprise and sees to it that local, state and national officials are elected on the basis of their advocacy of free enterprise, can we expect to regain the things we are putting aside during the emergency.

### Future of Air Conditioning

G. F. Goodall, Williamson Heater Company, Oak Park, Illinois, in discussing the future of air conditioning, stated that he understood an order was about to be enforced eliminating new gas heating systems in practically all states in the country where natural or mixed natural and manufactured gas is used for heating. This order has just been announced. Mr. Goodall expressed the belief that oil may follow suit. One



Convention speakers left to right—Fred Goodall, Williamson Heater Co.; Thomas O'Malley, Wage & Hour Board; C. H. Hall, Johns-Manville; A. G. Bryant, Bryant Engineering Co.; K. A. Albrecht, Social Security Board.

principal problem confronting the contractor today is the installation of furnace heating systems in small defense houses where the design and installation practices are definitely sub-standard but the solution to this, suggested Mr. Goodall is to go ahead and install the furnaces as specified, but to keep a record for future use when these systems can be brought up to our accepted standards. Since houses costing more than \$6,000 are definitely out of the picture in most areas, we can find some work to replace this lost market by installing, remodeling and repairing and changing heating systems in large old houses converted into multi-apartments. Mr. Goodall expressed the opinion that cast iron furnaces will probably be easier to obtain in 1942 than will steel furnaces.

#### Warm Air Heating Progress

Professor S. Konzo, University of Illinois, discussed developments in warm air heating practice, discussed briefly some of the problems confronting the industry. Prof. Konzo explained that Washington finds it easier to apply a blanket ruling such as the gas order, and then after the ruling goes into effect to release certain areas or districts from the regulations of the order. This likely will be the case in certain areas where the gas supply is not required for manufacturing needs.

FHA insured, privately financed housing offers considerable leeway in the general design, equipment used and installation practices followed, but publicly

50,000 Btu output; 50,000 to 65,000 Btu output; and 65,000 to 80,000 Btu output. Where the heat loss exceeds 80,000 Btu, Washington will insist that the house be insulated down to the 80,000 Btu maximum.

#### Warm Air Heating in Barracks

Prof. Konzo then went on to describe some of his experiences in investigating complaints on the heating systems in different army camps and explained some of the suggestions to obtain better firing results. These consist chiefly of one supervisor over each 50 furnaces in a camp and a chief supervisor over all sub-supervisors. These supervisors would be given daily, weekly and monthly report cards to be filled in, in order to check immediately any firing faults.

Our industry can contribute definitely to the overall war effort if we will strive for simplification; for example, 380 gravity pipe fittings can be reduced by 80 percent if necessary. Register sizes, types and finishes can be reduced approximately 80 percent in numbers, and so on. Generally speaking the industry can expect, as warned by Washington officials, that there will be fewer furnace sizes; reduced heat losses in houses; elimination of galvanized iron for ducts; no double-wall pipes; use of wood grilles; inside returns and generally close-coupled systems; substitutes for duct work to within six feet of the furnace; perhaps warm air ducts made of substitutes; many changes in local building codes; paint as a substitute for galvanizing; substitute materials for casings.

#### State Apprenticeship Law

Committees of the Wisconsin association have been active during 1941 and reported several achievements. Frank Kramer, reporting for the Apprenticeship Committee, said the Committee as a result of its year's study, believes that a uniform plan should be adopted for apprenticeship training throughout the entire state of Wisconsin. The Committee studied several local plans, but is not satisfied with any complete plan as yet. The Committee feels that eventually a state-wide plan should be adopted, setting up a state-wide course of apprenticeship training under local supervision, with progressive examinations, also with jurisdictional boards to settle any disputes. Hours of apprenticeship training, rates of pay for apprentices and general curriculums should be standard for all areas within the state. This suggestion will be acted upon by the Board of Directors during the coming year.

A. Walters, Chairman of the warm air, heating and air conditioning committee, reported that the proposed pricing schedule of the association has been revised in some details during 1941 and the Committee now feels ready to publish the book. During the past year printing prices have been considered and a completely different method of producing the book has been suggested and seemingly will reduce the printing cost approximately 50 percent. The committee considers this proposal favorably and hopes to have the price schedule printed within a reasonable time.

Secretary Paul Biersach reported an active 1941, excellent cooperation by officers, directors and committees, well-attended and enthusiastic district meetings throughout the year, and the association generally in an excellent financial position. Several new members have joined the association during the year and in most areas of the state, indications were that 1941 was a good business year for association members.

#### OFFICERS

President—Paul Krueger, Madison  
First V. P.—A. C. Mantei, Milwaukee  
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Third V. P.—A. J. Stiegler, Neenah  
Fourth V. P.—J. W. Birthrong, Waukesha  
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Treasurer—Frank Kramer, Milwaukee  
Secretary—Paul Biersach, Milwaukee  
Sergeant—Louis Stefanik, Milwaukee

financed PBA and FWA projects are strictly limited in the design and practices, explained Prof. Konzo, who then outlined briefly the scope of these two programs.

Under the revised Lanham act, the general dimensions, location, materials and etc., are established by Washington, but the house is designed by local architects, some of whom are pretty good and others are pretty terrible, said Prof. Konzo. As to what may be expected in the way of a heating system in 1942, the speaker declared: generally speaking it will be a coal-fired unit; the furnace, fan, motor, plenum and controls will cost from \$45 to \$70 to the contractor and to this will be added approximately \$50 for sheet metal work. The total cost will then be in the neighborhood of \$150.

Units of the PBA-18 type, originally submitted, had some faults, but present units meet all standard specifications and can be depended upon to do a good job of heating. Future building, said Prof. Konzo, will probably be restricted to authorized defense areas. There will likely be three sizes of furnaces: up to





Officers for 1942, left to right—President Carl M. Gundlach; Director Charles Lentz; Director Harvey Orton; Director Philip C. Young; Secretary A. E. Bogen; Director Wm. E. Feiten; Director William Lauer.

## Ohio Streamlines Its 1942 Convention

THE Ohio Sheet Metal Contractors Association crowded into one day and two evenings an annual convention which will rank high in the list of notable conventions staged by this 28-year-old organization. The program committee scheduled only a board of directors' meeting, registration and a free-for-all get-together for the first day until evening when, under the sponsorship of the convention committee (Milton Thesmacher, chairman; Jack Campbell, Mike Cutter, Bill Feiten, Art Franck, Bob Jack, Leo O'Connor, Jack Pennell, and Mrs. D. A. Mannen), six boxing bouts, one official wrestling match, musical entertainment and a buffet supper were offered. The entertainment committee did an excellent job—the boxing bouts were fast and good; in the wrestling match, the marines went down to defeat before a professional wrestler; the music was not at all bad; and the buffet supper was excellent.

This same entertainment committee did another splendid job on the banquet, inviting Dr. John L. Davis of New York City, nationally known after-dinner speaker, who offered for the second time to Ohio conventions his witticisms, philosophy, and humor. A splendid floor show with several acts, an excellent dinner, and dancing crowded the hotel's large ballroom.

Welcoming the convention to Cleveland, Samuel F. David, Director of Public Service of the City of Cleveland, pointed out that under today's war program, no one city and no one industry can now stand apart. We should be thankful; said Mr. David, that associations are still free to meet peacefully to study our problems and to contribute our part to the National defense program.

### Sheet Metal in 1942

Where do we go in 1942 in the Sheet Metal Business, was the subject of an address by J. D. Wilder, AMERICAN ARTISAN. Defining the sheet metal contractor as a shop having some power equipment such as a power shear or a brake or a press, with the owner actually managing and employing labor to do the work, the speaker pointed out that he was intentionally bypassing the small one-man shop where the owner

works with tools because this type of shop up to date has survived boom times and depressions, wars and peace, even the tremendous changes which have taken place in our own industry. Undoubtedly in the present war this small shop operator will exercise the same ingenuity, the same aggressiveness, the same spirit to stay in business so we can expect this contractor to exist in the face of present problems.

Some former activities which will be curtailed or completely dead during the emergency will be exterior sheet metal work such as copper roofs, all sorts of metal ornamentation, all types of work requiring scarce materials as copper, aluminum, stainless steel, etc. Another type of work which will be inactive will be the fabrication and erection of galvanized iron ducts for commercial air conditioning systems where comfort cooling is the service sold.

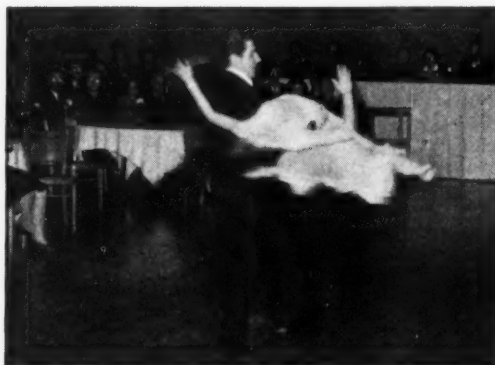
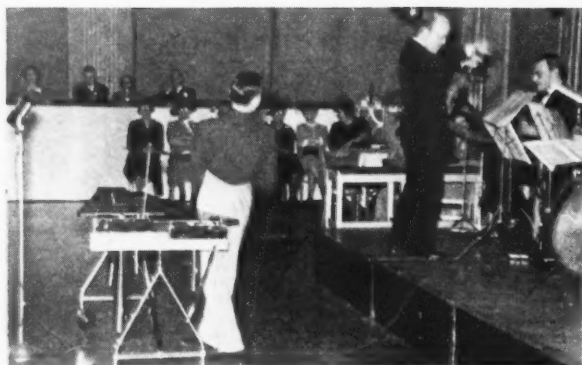
On the other hand, the speaker expressed the opinion that ventilation systems in industry where prime or sub-contracting will be undertaken will undoubtedly be just as active in 1942 as in the years previous. Much activity in fume removal and waste material collection was prophesied by the speaker who pointed out that many of the war products now being undertaken as prime or sub-contracts require even more than usual pre-process treatment.

Supporting this prophecy the speaker pointed out that the F. W. Dodge Corporation reported in August, 1941, that of the \$1,400,000,000 industrial expansion and construction program launched for war work in August 1940 only approximately 40 percent of the program was completed. Also that in January, 1942, the F. W. Dodge Corporation forecast a \$1,600,000,000 industrial construction program principally for the manufacture of war products. These figures forecast a continued tremendous construction of new plants for manufacture of war products.

The speaker pointed out that government is exerting great pressure to convert existing plants to the manufacture of war products under the contract distribution division of War Production Board.

Up to now, however, there have been far more sheet metal fabricating plants than products to be fabricated in these plants. The speaker described the various





Boxing and wrestling the first night and a floor show at the banquet kept the members, ladies and guests entertained. Some supper and banquet table groups.

sub-contract displays now in existence in some 14 large centers in the country and listed some of the products which can be manufactured in a sheet metal plant— a 30 and 100-pound chemical bomb; land mines; pieces requiring the punching, shearing and forming of strips and rod; bomb fin assemblies; trench mortar packing boxes; bomb fuse nose containers; navy cartridges, etc.

Other agencies of the government—quartermaster's corps, signal corps, medical corps, which heretofore have let contracts in large dollar volume as prime contracts are now releasing orders in small enough quantities so that the sheet metal fabricator can obtain prime contracts.

#### Warm Air Heating in 1942

Harold F. Sharp, 1942 president-elect of the National Warm Air Heating and Air Conditioning Association, briefly described some of the events at the association's Philadelphia convention as reported in the February *AMERICAN ARTISAN*. Mr. Sharp emphasized how the association's 20 years of research and progress have made it easy for our industry to convince Washington authorities concerned with heating that we really are in an excellent position to offer suggestions, advice and research co-operation. Generally speaking, said Mr. Sharp, this extension of co-operation has been thankfully received by all Washington agencies. Mr. Sharp declared the industry

should be encouraged by the appointment of Mr. W. Walter Timmis as chief of the plumbing and heating industries division of War Production Board because Mr. Timmis came up from our industry and personally has knowledge of our problems and facilities. The warm air member of the advisory committee of the Plumbing and Heating Industries branch, Mr. Will McGrath, has also done an excellent job of selling our industry and our association to Washington, said the speaker.

Indications are that the 1942 residential building volume will about equal the volume of 1941, but certainly most of the construction in 1942 will be in very small defense houses or in housing projects similar to the PBA and USHA multi-family housing units. Priority ratings in force or expected covering the obtaining of equipment and material for the maintenance of existing systems should at least equal 75 percent of the 1941 volume of similar material. The warm air heating contractor can greatly assist the warm air furnace manufacturer if he will always insist on obtaining a priority number for every new installation and also every remodelled installation and even for repair parts if possible, said the speaker. This obtaining of priority numbers passed from the contractor to the jobber or to the manufacturer will enable the manufacturer to prove the percentage of his production which is going into defense areas and into defense work. Only as our industry proves that the majority of its volume is in defense work will our

industry be able to obtain raw materials for the manufacture of furnaces, ducts, accessory equipment.

### The Problem of Scrap

Walter Seelbach of Forest City Foundries Company, and one of the scrap committee officials for the Cleveland area emphasized that the scrap situation is so critical that War Production Board has set up many offices to supervise the proper collection, segregation, and disposal of scrap material. Many foundries are shut down or working on short shifts because of a scarcity of scrap and only as all householders, business firms and manufacturing firms turn in their scrap through the proper distribution channels can this scarcity be alleviated. Not only metal scrap, but newspapers, magazines, burlap and packing, a whole list of publicized materials are badly needed and will be collected and distributed if the holder will notify the proper scrap dealers. Scrap material is being purchased at open market prices and there is no reason why anyone should give away scrap when it can be sold and the money obtained used to buy defense bonds. The collection and sale of scrap, said Mr. Seelbach, is a definite war contribution.

### Labor vs. The Draft Board

Vice President A. E. Bogen of Columbus and Secretary Carl M. Gundlach of Sandusky conducted a round table discussion of the labor situation as it is influenced by local draft boards. Mr. Bogen outlined the general problem of keeping essential workers and asked Mr. Gundlach, who is chairman of the Sandusky board, for definite suggestions to guide manufacturer employers in applying for exemption for needed employees or in judging the merits of an employee's case.

Mr. Gundlach pointed out that each case requires individual analysis but as a whole draft boards have been instructed to maintain in their community a sufficient number of artisans in each trade to insure proper maintenance, construction and operation of all existing local facilities. This means, in brief, that there must remain in a given community sufficient plumbers, furnace men, bricklayers, etc., to take care of all emergency and new construction work. Up to December 7, Mr. Gundlach said he believed most draft boards felt the army needed men more than industry but with production getting into such heavy volume, this need is shifting somewhat and certain classifications will be more needed in industry than

in the army. Employers must co-operate by being fair in their appeals and wherever a mechanic can be replaced by an over-age mechanic, or a physically deficient person, or where work can be shifted in such a way that one man can do the work of two, the employer should be willing to release his employee.

There seems no question, pointed out Mr. Gundlach, that there is going to be a shortage of mechanics in certain trades, but each employer should try his utmost to release as many potential army men as possible. The discussion was not very successful in answering specific questions since these questions usually consisted of a particular local problem which could be answered by only the local draft board.

### What the Army Wants to Buy

Major Charles S. Robinson, Public Relations Officer of the U. S. Army, Fifth Corps Area, described some of the problems of informing the public as to war progress and the preparation of the public mind to such necessary curtailments as sugar, tire, automobile rationing and similar measures. It is these curtailments, in the opinion of the major, which quickly make the public aware of the seriousness of the situation.

The sheet metal industry, said the speaker, is probably finding the going pretty rough and adjustment quite difficult in many instances. Materials are difficult to get and probably will become more difficult as time goes on. It is the hope of the quartermaster's department and the contract distribution division that more and more shops properly equipped will find in prime or sub-contracts one method of keeping busy. In order to assist this changeover, Washington is trying to distribute sub-contracts and prime contracts geographically and is also attempting to reduce the quantities of items in each order so that smaller shops may participate. One difficulty with this, said Major Robinson, is that orders which are too small make it unprofitable for a shop to retool for an all-out war basis.

Encouraging to the industry was the Major's assertion that the quartermaster department which purchases field kitchens, mess hall and field mess kits and eating equipment, stoves, steel helmets, 101 items of sheet metal and light plate is now seriously considering letting contracts in small enough quantities so that medium sized shops may profitably take such a contract. Other agencies which either are now

*(Continued on page 94)*



Speakers, left to right—Harold S. Sharp, President of the National Warm Air Heating & Air Conditioning Ass'n; Walter Seelbach, Cleveland scrap committee; Major Chas. S. Robinson, public relations officer, 5th corps area; A. D. Caddell, Industrial Commission of Ohio; G. A. Moore, War Production Board, Cleveland.



# Minneapolis Relaxes Code For Duration of the Emergency

IT probably will be of interest to readers to know what the city of Minneapolis has done and contemplates to make it possible for heating contractors to design and install furnace systems which meet the provisions of the Minneapolis ordinance and at the same time meet the restrictions on materials, equipment design, installation practices insisted on by such agencies as FHA, WPB, FWA, USHA, OPA.

A recently passed ordinance authorizes various city departments to permit deviations from ordinances which the departments are charged to enforce.

Says H. M. Betts, Senior Heating Engineer—"These deviations must in each case be approved by the City Council and will be in effect only so long as the emergency exists. These deviations do not in any way change the original provisions of the ordinances affected.

"To date the only deviations we have permitted have been the substitution of a lighter gauge copper tubing for oil burner installations and the substitution of No. 20 gauge galvanized iron with reinforcing ribs on the sides and heads for the 16 gauge black iron in the construction of 275 gallon fuel oil tanks.

"We are at present faced with a shortage of galvanized iron sheets for warm air heating installations and may have to find a suitable substitute in the near future."

Following is the ordinance:

Authorizing certain deviations from the requirements of the ordinances of the City of Minneapolis regulating the installation, alteration and repair of refrigeration, electrical wiring, air conditioning, heating and ventilating, oil and gas burner installations, stokers, flammable liquid installations, and dry cleaning deemed appropriate and made necessary by the present national emergency, and prescribing the procedure relative thereto.

Whereas, during the present national emergency, it has become impossible to secure some materials to strictly comply with present ordinances of the City of Minneapolis, with respect to certain construction, installations, alterations and repairs.

Now, Therefore, The City Council of the City of Minneapolis do ordain as follows:

Section 1. The Inspector of Buildings and the Chief of the Fire Prevention Bureau of the City of Minneapolis be and they are hereby authorized to jointly recommend in writing deviations from the present ordinances of the City of Minneapolis relating to and regulating the construction, installation, alteration and repair of refrigeration, electrical wiring, air conditioning, heating and ventilating, oil and gas burner installations, stokers, flammable liquid installations, and dry cleaning, which they find are necessary because of the lack of materials, due to the national emergency, and which deviations they deem appropriate and necessary and which in their judgment will

not materially affect the public health, safety and welfare or the health, safety and welfare of occupants of premises upon which such deviations are permitted. Such recommendations of such officers may be general or special, and shall set forth in detail the deviations approved and recommended by them, and the reasons therefor. Such recommendations shall be filed with the City Clerk and presented to the City Council, which may either approve or disapprove the same. Any deviation from the ordinances of the City shall be unlawful unless and until the City Council shall in regular or special meeting approve the same.

Section 2. Any person who shall violate any of the provisions of this ordinance shall, upon conviction thereof before the Municipal Court of the City of Minneapolis, be punished by a fine or not exceeding One Hundred Dollars (\$100.00), or by imprisonment until such fine is paid for not exceeding ninety (90) days.

Section 3. This ordinance shall take effect and be in force from and after its publication, and the authority hereby granted shall cease at the conclusion of the national emergency, or sooner if the necessity therefor no longer exists.

Passed September 12, 1941. W. Glen Wallace, President of the Council.

Approved September 12, 1941, Marvin L. Kline, Mayor.

Attest: Chas. C. Swanson, City Clerk.

## National Housing Agency

BY Executive Order 9070 of February 24, President Roosevelt merged the Federal housing agencies into the National Housing Agency, under Administrator John Blandford, Jr., formerly assistant director of the budget.

### Three Units Created

Three main units were established in the National Housing Agency, each to be administered by a commissioner acting under the direction and supervision of the National Housing Administrator:

1. *The Federal Housing Administration*, under Commissioner Abner Ferguson, present administrator of the Federal Housing Administration.

2. *The Federal Home Loan Bank Administration*, under Commissioner John H. Fahey, present chairman of the Federal Home Loan Bank Board.

3. *The Federal Public Housing Authority*, under Acting Commissioner Leon Keyserling, present acting administrator of the U. S. Housing Authority.

### Agencies and Functions Consolidated

The following agencies and functions were consolidated by the order:

The Federal Housing Administration; Federal Home Loan Bank Board; Home Owners Loan Corporation; Federal Savings and Loan Insurance Corporation; United States Housing Authority; functions of the Federal Works Administrator that relate to defense housing; War and Navy Department functions

(Continued on Page 96)



# Association ACTIVITIES

## New York State

The annual convention of the New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., will be held at the Hotel Utica, in Utica on March 17, 18 and 19.

Following registration at 9:30 in the lobby, will be the president's message and the appointing of the Credential, Auditing, Nominating and Resolution Committees.

At 10:30, Prof. Lorin G. Miller, head Department Mechanical Engineering, Michigan State College, will begin the first session of the Forced Air Heating School.

At 1:30 p. m., following luncheon in the Mulberry Room, Prof. Miller will conduct the second session of his heating school, and at 6:30 p. m., the third session of the heating school will follow a two-hour recess.

At 9 p. m. there will be entertainment, dancing, lunch and refreshments in the ballroom—courtesy merchandisers and affiliated manufacturers and jobbers.

On Wednesday at 9:30 a. m., William P. Haines, Laverack & Haines, Inc., Group Managers, will talk on "Our State Compensation Group" with news to date.

At 10:30 a. m., I. L. Jones, president International Heater Company, will talk on "The Emergency Committee."

At 11:15 a. m., V. R. DeWald of Johns-Manville Co., will speak on "Built-Up Roof Repairs."

At 2 p. m., "Priorities" as they effect our business will be discussed by David H. Butler, Office of Heating & Plumbing Division, WPB, Washington, D. C.

At 3:30 p. m., W. W. Graham of The American Rolling Mill will talk on "War Production and the Sheet Metal Contractor."

At 4:30 p. m., "Slate Roofing" is the subject, with the speaker to be announced later.

Time for discussion is allotted following each of these speakers.

The banquet will be held at 7 p. m., with entertainment and dancing until midnight.

On Thursday at 10 a. m., the meeting will be for state members only with reports of officers, committees, auditing, nominating, and resolution, installation of new officers and general discussion for the good of the association.

The convention committee chairman is Adolph Hesse. The association hopes that the convention will result in at least one little idea for each person attending to make the trip a success, and that the stay in Utica will be a pleasant one.

Clarence J. Meyer, State Secretary,  
569 Genesee St., Buffalo, N. Y.

## Jacob A. Temple Dies

Jacob A. Temple, prominent in the sheet metal business in Kalamazoo, Michigan, and a life-long resident of Kalamazoo, died recently following a cerebral hemorrhage. Mr. Temple learned the trade at the age of 14 years and in 1907 founded the Kalamazoo Sheet Metal Manufacturing Company, along with two other partners. He continued as manager of this firm for over 20 years until retirement. In 1930, he established the J. A. Temple Company—engineers, contractors, air conditioning, manufacturers, jobbers, and sheet metal products—located at 108 Parkway, Kalamazoo.

The J. A. Temple Company will continue under the management of his sons, Robert and W. J. Temple. W. J. Temple has been with his father since 1914 and Robert has been with him for many years.

## 11th Forced Warm Air Conference

The eleventh annual forced warm air conference will be held at Michigan State College, East Lansing, Michigan, on March 23, 24, 25 and 26. The program follows:

### Monday

- 9:30-10:30 A. M. Registration—111 Olds Hall of Engineering.
- 10:30 A. M. "History and Progress in Furnace Rating," A. P. Kratz, Research Prof., Univ. of Illinois.
- 12:00 M. Luncheon—Union.
- 1:30 P. M. The Problem.  
"Calculation of Heat Loss," Ross Wallis, Meyer Furnace Co.
- 6:30 P. M. Dinner—"Government War Time Contracts," C. L. Allen, Head of C. E. Dept., M. S. C.  
"Adequate Controls for the Small Residence," C. W. Nessel—Minneapolis-Honeywell Co.

### Tuesday

- 9:00 A. M. "Heat Loss from Basement," C. H. Pesterfield, M. S. C.  
"Heat Loss by Infiltration," Ed Root, Superior Safety Furnace Pipe Co.
- 12:00 M. Luncheon—Union.
- 1:00 P. M. "Converting Heat Loss to C.F.M. Recirculation vs. Register Temperatures," Earle Maynard, Fox Furnace Co.  
"Layout and Design of War Air System with High Grilles," Bruce McLouth, McLouth Air Conditioning Corp.
- 6:30 P. M. Dinner—"Chimneys"—John Miller, Motor Wheel Corp.  
"Combustion Problems Peculiar to Small Units," A. P. Kratz, Research Prof., Univ. of Illinois.

### Wednesday

- 9:00 A. M. "Layout and Design of Warm Air System with Low Grilles," Ed Root, Superior Safety Furnace Pipe Co.
- 12:00 M. Luncheon—Union.
- 1:00 P. M. "Costing Out the Job," Bruce McLouth, McLouth Air Conditioning Corp.  
"Registers and Grilles," Chas. Pearson, President, U. S. Register Co.
- 6:30 P. M. Banquet—Speakers: Boeddener, Sharp, Kratz.

### Thursday

- 9:00 A. M. "Filters."  
"Overall Resistance and Selection of Fan," Fred Bishop, The Brundage Co.
- 12:00 M. Luncheon—Union. Announcements.  
Adjournment.

### COSTS

Dormitory, meals, course fee, laboratory fee.....	\$15.00
Meals, course fee, laboratory fee.....	12.00
Course fee, laboratory fee.....	4.00

For further information, communicate with Professor Lorin G. Miller, Department of Mechanical Engineering, Michigan State College, East Lansing, Michigan.

### 1942

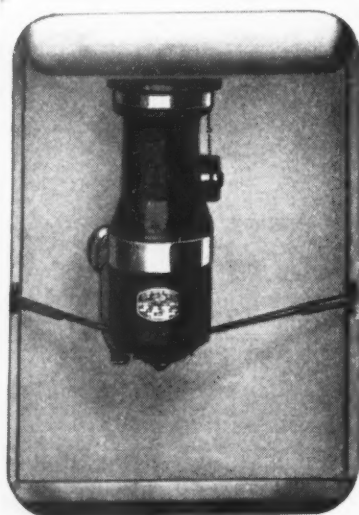
### CONVENTIONS

- Mar. 17-19—New York State Sheet Metal, Roofing & Air Conditioning Contractors' Assn., Inc., Annual Convention. Utica, N. Y. Clarence J. Meyer, State Secretary, 567 Genesee St., Buffalo.
- Mar. 23-26—11th Annual Forced Warm Air Conference at Michigan State College, East Lansing. Professor Lorin G. Miller, Mechanical Eng. Dept., Michigan State College.
- April 8-9—Illinois Sheet Metal Contractors Association. Hotel Jefferson, Peoria. Wm. W. Johns, Secretary, 212 W. Main St., Urbana.
- Apr. 17-18—The Roofing and Sheet Metal Contractors Association of Florida. Annual. Miami. L. A. Burgess, Secretary-Treasurer.

# New PRODUCTS

## ● 27—Dispos-O-Matic

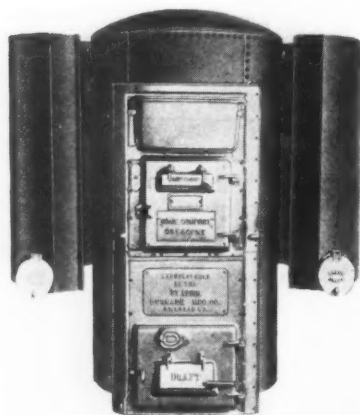
Scott-Newcomb, Inc., 1922 Pine St., St. Louis, has put on the market "Dispos-O-Matic," a garbage disposal unit attached to the kitchen sink.



This unit completely disposes of all kitchen food waste, including bones, fruit pits, etc. Food waste is shredded into minute particles and carried down the sink drain into the sewer. One of the special features of this unit is the automatic reversing of the motor each time the unit is turned on.

## 28—Twin Radiator

The St. Louis Furnace Manufacturing Co., 2901 Elliot Ave., St. Louis,



announces a twin-radiator model. The unit is rated from 400,000 Btu for hand firing to 450,000 Btu for stoker or oil firing.

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 92 and mail to us.

● Indicates product not listed in 1941 Directory.

△ Indicates manufacturer not listed in 1941 Directory.



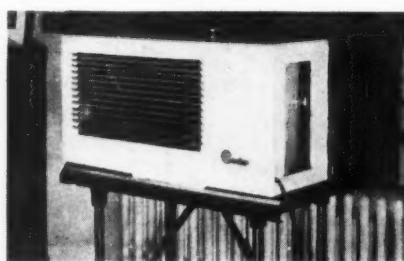
## ● 29—Identification Button

Parisian Novelty Company, Dept. 3, 3510 S. Western Ave., Chicago, is manufacturing a new, tamperproof photographic identification button for defense workers, to be worn by plant and office employees to facilitate instant recognition. Also worn by servicemen, truck drivers and messengers whose work takes them into plants working on defense jobs.

The buttons are washable, unbreakable and tamperproof. Each button is over 2 in. in diameter and contains a good-sized photograph of the worker.

## ● 30—Blackout Window Cooler

Pleasantaire Corporation, Tower Building, Washington, D. C., has announced their new ½ h. p. "Blackout" Pleasantaire—a window-type ventilating device in a cabinet which will house the refrigeration equipment at a later date when available. The "Blackout" unit brings in filtered



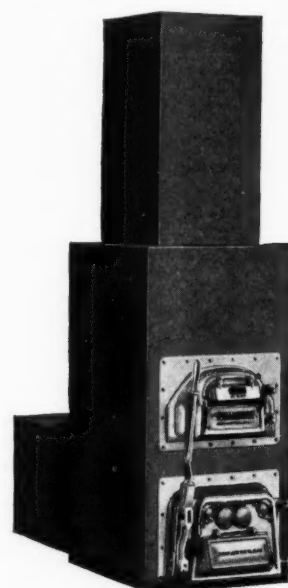
fresh air, cleans room air and exhausts stale air simultaneously, if desired. It fits in the window with plywood wings filling in the additional space on either side of the unit.

The machine is 28 in. wide and 14½ in. deep, covered in simulated leather, and uses spun glass oil-treated filters.

## ● 31—Defense Heating

The Williamson Heater Co., 337 W. Fifth St., Cincinnati, Ohio, offers the D-18 Defense Housing unit for heating non-commissioned officers quarters and for defense houses.

The unit embodies the base castings of the Williamson 18-in. standard furnace, less the radiator, which is re-



placed by a sturdy cast iron smoke elbow. The rating at bonnet on a 7½ lb. combustion rate is 64,000 Btu, while the shipping weight complete with plenum, blower, motor and controls is only 700 lbs.

The casing is finished in an attractive gray, baked enamel.

## ● 32—Improved Appton Hammer

The Lockformer Company, 4615 Arthington St., Chicago, international distributors of the Appton Super Air Hammer, announce major improvements in the air hammer construction. Lifting the hammer from the work stops the hammer action immediately.

The Appton is especially helpful to the sheet metal shop in turning down the "hammer-over-edge" of Pittsburgh locks. It measures 9½ inches over all and weighs 5 pounds. It is easily held and operated in one hand, has no recoil and is easily adjustable. A knurled ring regulates the force of the blow. The Appton uses from 3.2 to 7 feet of free air per minute and operates at pressures from 30 pounds to 100 pounds.

**for DEFENSE  
HOUSING  
PRICED RIGHT  
to help you  
get the order**

## **WATERBURY WARM AIR FURNACES**

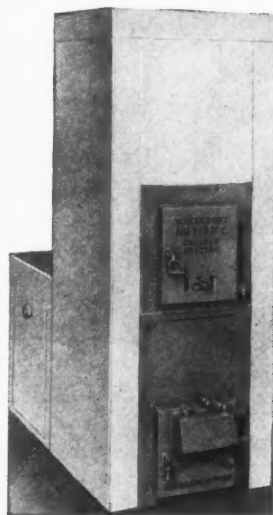
*GRAVITY or FORCED AIR*

**W**ATERBURY offers a complete line to meet all Defense Housing Requirements — coal, (hand-fired or stoker), gas or oil-burning — specially - designed models for first floor or basement installation—in addition to the regular line of WATERBURY SEAMLESS and WATERBURY GASTITE gravity furnaces—all with the famous WATERBURY leak-proof welded steel body construction.

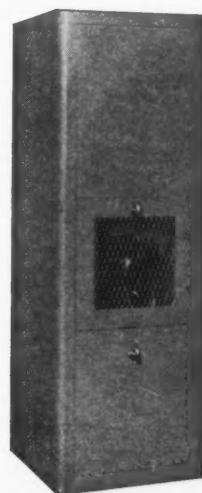
With every WATERBURY unit you get the advantages of the same skillful and advanced WATERBURY engineering that has pioneered and developed many of the most important improvements in warm air and conditioned-air heating.

For Defense Housing, as surely as for normal home building, it is reassuring to know that the heating system you install has a reputation for conserving fuel, upkeep costs, time, energy and health for the home occupant and his family. WATERBURY has built its business on that principle for 35 years.

**Get your share of  
Defense Housing Business  
—with the WATERBURY line.  
Write for full information.**



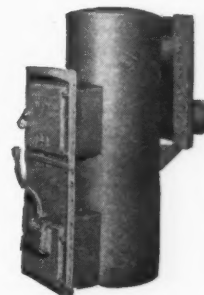
Size 718-10 Forced Warm Air Unit for Hand-fired Coal. Also available in High Boy Model Size HB 718-10.



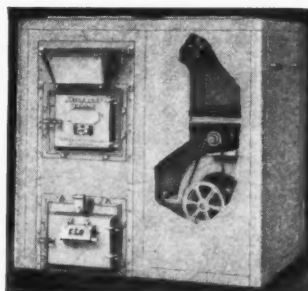
Size VHB 4312-10. Size HB 4412-10 Highboy Forced Warm Air Unit for Oil or Gas.



Size 718 Gravity Furnace.



Size 718 RC Gravity Furnace.



700 Series Forced Warm Air Unit for Coal (Hand or Stoker Fired) for Oil or for Gas.



700 Series Gravity Furnace for Coal (Hand or Stoker Fired) for Oil or for Gas.

**THE WATERMAN-WATERBURY COMPANY**  
1122 JACKSON STREET N. E. MINNEAPOLIS, MINN.

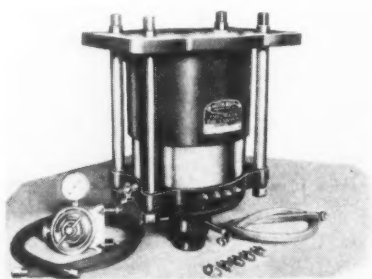


# New Products . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 92.

## • 33—DB Die Cushion

The Dayton Rogers Manufacturing Company, 2830 Thirteenth Avenue So., Minneapolis, announces a new Model DB Universal Pneumatic Die Cushion adaptable to a large percentage of press operation where cushioning means is required for drawing and forming operations. It is a complete self-contained unit that automatically



maintains a predetermined cushioning pressure on either the draw ring or pressure pad. This pressure pad control is made possible by a combination regulator and gauge furnished with each installation. A record is kept of the pressure by means of the pressure gauge and on future setups this working pressure is quickly duplicated.

## 34—Packaged Furnaces

General Electric Company, Air Conditioning and Commercial Refrigeration Department at Bloomfield, N. J., has developed a line of winter air conditioners for defense housing, available in an oil-fired model and three gas-fired units.

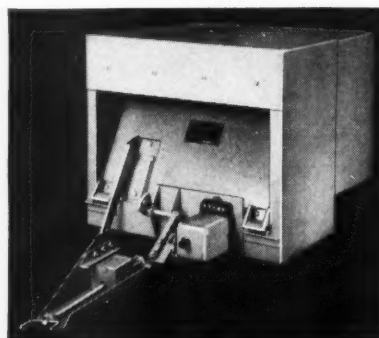


The units have cast iron heating surfaces. The surfaces have gasketed joints. A limit switch stops the main gas supply should the unit overheat. A gas pressure regulator control maintains a relatively constant gas pressure to the main burners.

The oil-fired packaged warm air conditioner has a rated capacity of 100,000 Btu per hour. This unit utilizes the G-E atomization process.

## 35—Motorized Draft Control

Field Control Division of H. D. Conkey & Co., Mendota, Illinois, has placed on the market a new motorized Field commercial draft control.

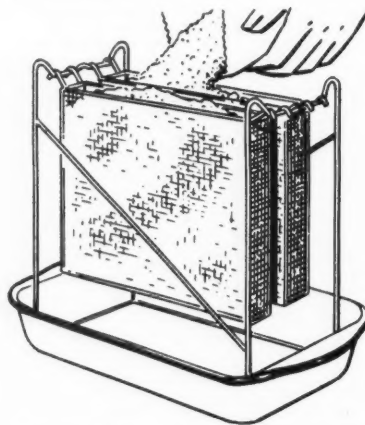


The unit is comprised of a standard type Field commercial draft control operated by a pusher type motor.

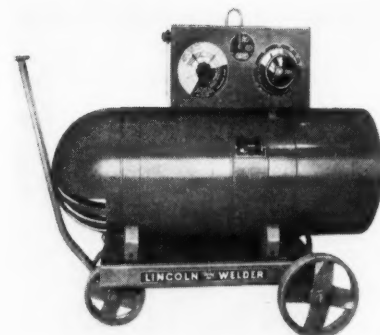
The new model is designed to effect maximum fuel economy in commercial installations by a more accurate control of the natural draft. The motor operates during both "on" and "off" periods of fuel feed, cutting the consumption of fuel oil or coal to a minimum. Available for all sizes and types of installations.

## 36—Dri-Air

Tamms Silica Company, 228 N. La Salle St., Chicago, offers an inexpensive Dri-Air chemical powder, and has designed a convenient container which allows the powder to be exposed to the air at all angles to do a maximum air-drying job.



The container is made up of a basket that holds ten pounds of Dry-Air chemical powder. As moisture is drawn from the air to powder, the drippings are deposited in a metal pan below the basket. As powder is used up, more may be added at the top of the basket. One Dri-Air container is recommended for each 800 to 1,000 cu. ft. of space.



## • 37—Arc Welder Control

The Lincoln Electric Company, 12818 Coit Road, Cleveland, announces an improved and simplified design of its exclusive system of "Dual Continuous Control" for arc welding machines which eliminates the need for meters showing volts and amperes.

These welders have both job selector and current control calibrated and equipped with dials which indicate the type of work and the number of amperes for each and every setting.

Another feature of this welder control is that both voltage control (job selector) and current control are continuous in operation.

Being continuous, the control can be advanced or retarded in increments as fine as desired.

## 38—Perfection Model 600

Perfection Stove Company, 7609 Platte Avenue, Cleveland, announces a new oil burning furnace for Defense housing designed to meet Government specifications—known as Model 600.

The Model 600 oil burning furnace is complete with oil burner, blower motor, pressure type blower, controls, mechanical draft blower and balanced type draft regulator.



The burner is the Perfection Stove Company's patented two-stage burner, rated and approved by the Underwriters' Laboratories for burning No. 2 fuel oil. The heating capacity is given as 60,000 Btu. at the bonnet, the maximum fuel consumption six-tenths of a gallon per hour and the operating efficiency in excess of 70 per cent.

The casing is 24-gauge steel with a 26-gauge steel inner-liner.



# A WAR MESSAGE to ALL EMPLOYERS

★ From the United States Treasury Department ★

WINNING THIS WAR is going to take the mightiest effort America has ever made—in men, in materials, and in money! Every dollar, every dime that is not urgently needed for the civilian necessities of food, clothing, and shelter, must, if we are to secure final Victory, be put into the war effort.

An important part of the billions required to produce the planes, tanks, ships, and guns our Army and Navy need must come from the sale of Defense Bonds. Only by regular, week by week, pay-day by pay-day investment of the American people can this be done.

This is the American way to win. This is the way to preserve our democratic way of life.

Facing these facts, your Government needs, urgently, your cooperation with your employees in *immediately* enrolling them in a

## PAY-ROLL SAVINGS PLAN

The Pay-Roll Savings Plan is simple and efficient. It provides, simply, for regular purchases by your employees of United States Defense Bonds through systematic—yet voluntary—pay-roll allotments. All you do is hold the total funds collected from these pay-roll allotments in a separate account and deliver a Defense Bond to the employee each time his allotments accumulate to an amount sufficient to purchase a Bond.

The Pay-Roll Savings Plan has the approval of the American Federation of Labor, the Congress for Industrial Organization, and the Railroad Brotherhoods. It is now in effect in several thousand companies varying in number of employees from 3 to over 10,000.

In sending the coupon below, you are under no obligation, other than your own interest in the future of your country, to install the Plan after you have given it your

consideration. You will receive—1, a booklet describing how the Plan works; 2, samples of free literature furnished to companies installing the Plan; 3, a sample employee Pay-Roll Savings authorization card; and 4, the name of your State Defense Bond administrator who can supply experienced aid in setting up the Plan.

To get full facts, send the coupon below—today! Or write, Treasury Department, Section B, 709 Twelfth St., NW., Washington, D. C.

## HOW THE PAY-ROLL SAVINGS PLAN HELPS YOUR COUNTRY

- 1 It provides immediate cash now to produce the finest, deadliest fighting equipment an Army and Navy ever needed to win.
- 2 It gives every American wage earner the opportunity for financial participation in National Defense.
- 3 By storing up wages, it will reduce the current demand for consumer goods while they are scarce, thus retarding inflation.
- 4 It reduces the percentage of Defense financing that must be placed with banks, thus putting our emergency financing on a sounder basis.
- 5 It builds a reserve buying power for the post-war purchase of civilian goods to keep our factories running after the war.
- 6 It helps your employees provide for their future.

**MAIL THIS COUPON NOW**

Treasury Department, Section B  
709-12th St., NW.  
Washington, D. C.

We want to do our part. Please  
rush full information regarding  
the Pay-Roll Savings Plan.

NAME .....  
POSITION .....  
COMPANY NAME .....  
ADDRESS .....  
NUMBER OF EMPLOYEES .....



**MAKE EVERY PAY-DAY... BOND DAY!**  
**U. S. Defense BONDS ★ STAMPS**

This space is a contribution to NATIONAL DEFENSE by AMERICAN ARTISAN

GPO 16-25943-1 Form No. DSS-BP-2



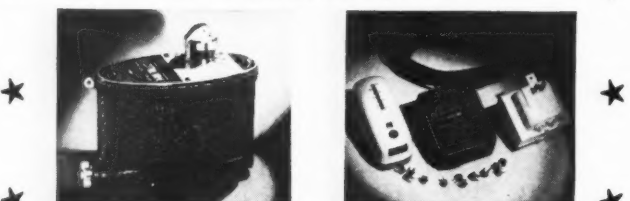
★ **No Other Type of Heating** ★  
**Gives So MUCH HEAT** ★  
**per Pound of METAL** ★  
★ **as the Vaporizing Type Oil Burner!** ★

★ The Defense Housing Coordination Office estimates ★  
a total of over half million new family dwellings will ★  
be built in 1942 to house Defense Workers. The ★  
heating of many of these with "packaged" Vapor- ★  
izing Type Gravity Feed Oil Burning units will be ★  
YOUR responsibility.

★ These new compact Heating units are equipped ★  
with new A-P DEPENDABLE Oil CONTROLS and ★  
offer definite assurance of fuel economy, dependable ★  
heat, owner satisfaction . . . A-P Oil Controls de- ★  
signed for each unit, tested to accuracy and efficiency ★  
in A-P Laboratories. . . Built to help YOU to low ★  
cost, trouble-free, long-lasting, profitable heating in- ★  
stallations. Insist upon these A-P DEPENDABLE Oil ★  
CONTROLS on the Heating Units you sell and install.

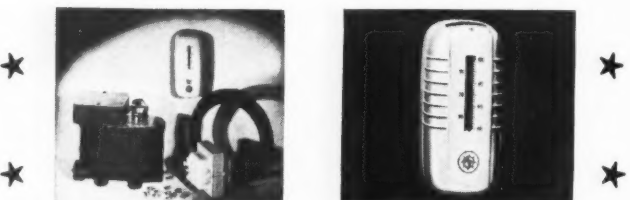
★ To Manufacturers: ★  
A-P welcomes YOUR control problems — and ★  
promises a solution that will help you to better serve ★  
Defense Heating demands.

★ **A-P DEPENDABLE Controls** ★  
used on Defense Heating Plants



★ A-P Constant Level Oil Control — with Fuel Com- ★  
pensator

★ A-P Thermostatic Heat Regulator Set...with ★  
Fan Switch



★ A-P Complete Furnace Control Sets for all types of ★  
Gravity Oil Burning Furnaces

★ A-P Thermostat...with ★  
"Heat Anticipator"

★ **AUTOMATIC PRODUCTS COMPANY** ★  
2452 NORTH THIRTY-SECOND STREET  
MILWAUKEE WISCONSIN



## Association Activities . . .

(Continued from page 83)

### Milwaukee

The Milwaukee Sheet Metal Contractors Association met on March 2 at the Hotel Medford, Milwaukee, with President Walter Marth presiding.

Chairman Edward Arndt added some information to the written report on the Merrimac Powder Project sent to every member of the State association so that all will be familiar with what is expected on the project for prospective bidders.

Angelo Hoffman of the Apprenticeship Committee answered the chair as to the status of the extra two hours time put in by apprentices at schooling as to credit and other matters, which will be made clear next meeting.

Chairman Belau of the Labor Committee submitted his written report and added what happened during the conferences with the Union Committee Local No. 24. The subject was discussed for the balance of the evening until finally member A. C. Goethel moved, seconded by T. Tonnson, that we recognize the labor of the labor committee and grant the men a ten cent increase in their per hour wages, which was unanimously carried.

The chair called attention to a letter received from the Massey-Harris Company regarding work which they are in a position to sublet to those qualified to perform in accordance to their questionnaire.

The meeting adjourned at 10:10 p. m. for refreshments.

Paul L. Biersach, Secretary.

### Badger Ordnance Project at Merrimac, Wisconsin

The Wisconsin Sheet Metal Contractors Association appointed a committee with Edward Arndt as Chairman to report on the Badger Ordnance Project at Merrimac. The association has contacted all the Wisconsin congressmen and senators at Washington and encouragement has been received from those who have replied. Mayor Carl F. Zeidler and Governor Julius P. Heil have also been contacted.

Edward F. Arndt, Chairman, and committee members Walter Marth and W. J. Hielscher went to Baraboo on February 18 and obtained the following information:

Each bidder must file his name and qualifications with the Mason & Hanger Co., at Baraboo, Wisconsin. Qualifications are:

1—Financial ability to complete work upon which bid is filed. Financial statement is not necessary, but references are to be given, such as firms and contractors for whom the bidder has done work; the name of the bidder's bank; and how large a contract the bidder can handle.

2—The equipment the bidder possesses; the kind of work he is best equipped to perform; and other information which might be pertinent to his business.

3—The kind of work the bidder would like to bid on.

Contractors may bid separately or may form a pool and bid as a group under one name. Publicity will be through Western Builder and plans can be secured with the proper deposit from the Mason & Hanger Co. Bidders may also be able to bid from plans at the Company office at Baraboo, with a deposit. This room, we are told, will be under guard for the protection of the plans and information.

A bond will be required with each bid and Mason & Hanger will decide how much work each bidder will be able to handle. Although bidding is open, the committee was assured that Wisconsin contractors will be given preference if they can qualify and if bids are in order.

When the plans are ready, Chairman Arndt suggests a meeting to determine whether proper consideration is being given and to help any members who have difficulty in bidding on the work.

The committee is still operating and the association will relay without delay any information of interest and help.

Paul L. Biersach, Secretary.



*then I said to myself—*



## It's development— or envelopment

*I thought this field trip was to preview tomorrow's world of welding—but look what's happening today.*

**ALTER EGO:** It may be tomorrow to you but I'm afraid it's yesterday to these people. Here they've completely shield-arc welded a building in the shop—toted it to location on a shield-arc welded truck-trailer—dropped it to the foundation with a shield-arc welded tractor crane.

*And here I am worrying about whether it's time for us to consider arc welding for some of our simpler designs.*

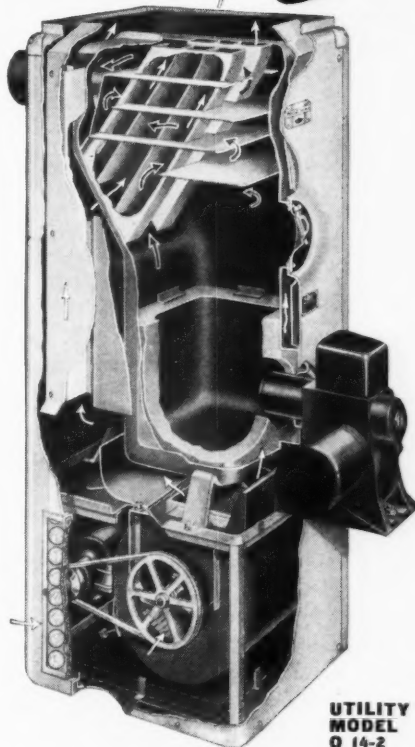
**ALTER EGO:** Well, this company started with welding. Found it worked, developed a stride. Now they're leaders in their field—largely because they use welded construction 100%.

*And, as they say, "The result is a lighter, stronger product—be it machine, building, ship or what have you—a design that can be more easily and quickly changed for improvements." No wonder they've kept their products away from any enveloping movement. Their flanks won't be blitzed in the Battle for Business a few years hence. So much for them—but how about us—how can we get similar results for our products?*

**ALTER EGO:** Wouldn't it be well for us to get practical pointers on changeover to welding from the big Procedure Handbook, published by The Lincoln Electric Company, Cleveland, Ohio. Let's invest \$1.50 in it now, what say?

ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

# For Defense Housing Sell the



UTILITY  
MODEL  
O 14-2

The Mor-Mac Utility Model 14-2 Tubular Winter Air Conditioner is helping many dealers in the defense areas to maintain their volume, which has been seriously threatened by the restrictions on larger heating units. It is designed for the small home and meets defense housing needs perfectly.

Priced to sell within small home budgets and still assure a fair margin to the dealer, the Mor-Mac Utility Model is unique in the field. Its beauty, efficiency and economy are outstanding. It is a packaged unit and is shipped completely assembled. The dealer has only to set the burner and connect the wiring.

The Utility Model is designed for either oil or gas firing. Bonnet Output (Oil) 67,000 B.t.u., (Gas) 64,000 B.t.u.; Input (Oil) 0.6, (Gas) 80,000; Casing Width 22"; Casing Length 25"; Casing Height 58 3/4"; welded, heavy copper-bearing steel firebox; scientific air distribution; pre-assembled, attractively finished, die stamped casing; over-size blower.

### Attention, Distributors—Dealers!

We have prepared a simple, concise chart which shows you exactly the steps you must take in ordering Mor-Mac Equipment on priorities. It shows you exactly how to proceed, and answers the questions that you are bound to have unless you are thoroughly familiar with the procedure.

Your copy is ready. Please ask for it on your letterhead. There's no obligation, of course.

**Utility  
MODEL  
14-2**

**MORRISON STEEL PRODUCTS, INC.**  
601 Amherst Street Buffalo, New York

## New Literature . . .

For your convenience in obtaining copies of new Literature use the coupon on page 92.

### 212—Rudico Steel Oil Air Conditioners

The Rudy Furnace Company, Dowagiac, Michigan, has issued a new 6-page folder describing their Rudico steel oil heat air conditioners with heat equalizers, in three sizes with output ratings from 81,000 to 185,000 Btu per hour.

### 213—Plastic Architectural Mouldings

R. D. Werner Co., 380 Second Avenue, New York City, is distributing an 8-page catalog covering their Plastiktrim as a decorative trim for edgings, nosings, cap sections, coves and wall trim, in five attractive colors.

### 214—Winter Air Conditioning for Small Homes

Airtemp Division, Chrysler Corp., Dayton, Ohio., is distributing a 4-page folder with space for dealer imprint and detachable return home survey card. The folder calls attention to proper temperature, forced air circulation, filtered air and proper humidity; pictures and describes the Airtemp Vapor-Flame oil furnace and compares its cost and operation expense with hand-fired equipment.

### 215—Metal Working Machinery—Hand

Whiting Corporation, Quickwork Division, Harvey, Illinois, offers the following two bulletins:

QW-107—Stamping Trimmer

QW-106—Metal Working Machinery

The Stamping trimmer trims, forms, beads, flanges large or small stampings in straight line production or job work.

Metal working machinery covered in QW-106 includes rotary shears and attachments, throatless shears, power hammers and stamping trimmers.

### 216—Oil Furnaces for Defense Homes

H. C. Little Burner Company, Inc., San Rafael, California, is distributing a 16-page catalog covering their six oil-burning furnaces designed especially for small homes. There are six general types, fourteen models, with heat outputs from 47,250 to 125,000 Btu—two floor furnaces, two cottage types, and two automatic winter air conditioning units for larger homes. Specifications are included.

### 217—Grilles, Registers, Air Control Devices

Stewart Manufacturing Company, Orange, N. J., offers Catalog 41, entitled "Grilles, Registers and Air Control Devices for Air Conditioning and Ventilating." 12 pages and cover, with illustrations, description, specifications and list prices. Other products are aluminum backdraft dampers, access doors, loud speaker grilles, curved and special shaped grilles, supply outlet grilles and store front grilles.

### 218—100th Anniversary Steel Stock List

Joseph T. Ryerson & Son, Inc., Chicago, has issued their 100th anniversary Steel Stock List. The issuance of this 268-page catalog data book marks the observance of their 100 years of Steel Service to American Industry.

In addition to a full listing of the more than 11,000 different kinds, sizes, and shapes of steel bars, shapes, plates, sheets, tubing, cold finished, alloy tool and stainless steels normally carried in stock for immediate shipment . . . the 1942-43 Ryerson Stock List contains a brief history of the growth of the organization from a small iron store in 1842 to a group of ten large plants.

With many types and sizes not available, the need of up-to-the-minute information on alternate sizes and substitute qualities is highly essential to those struggling with steel problems. This Ryerson publication has, perhaps, the most comprehensive steel listings of its kind.

## Show all industry the value of Air Cooling in Hot Weather

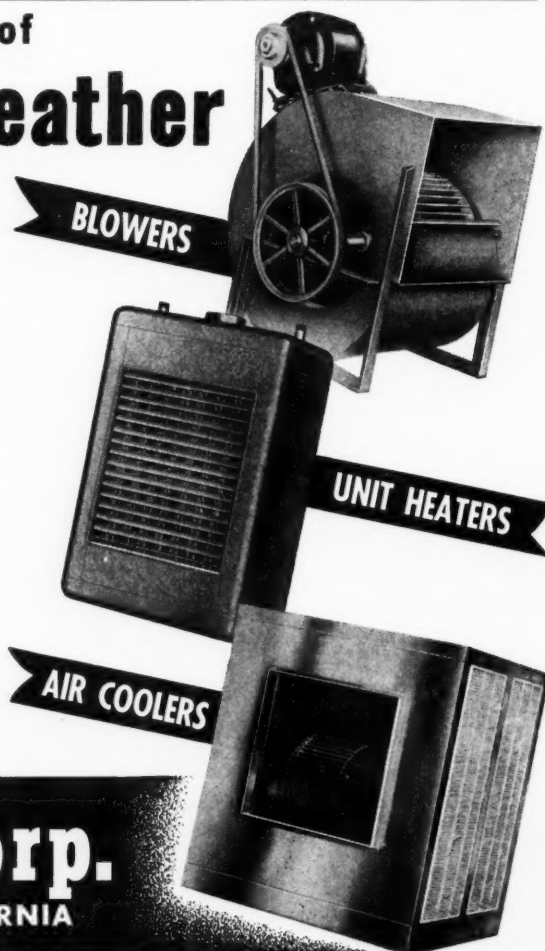
Overtime hours and seven-day weeks put a new strain on industrial workers—that will be much greater in hot weather. Only proper working conditions can prevent a summer slump in essential production.

Utility air Koolers are ideal for industrial plants, offices and shops. They are quickly installed—low in first cost and operating expense—give maximum comfort—are fully proven.

*Depend on*

**UTILITY FAN Corp.**

4851 S. ALAMEDA • LOS ANGELES, CALIFORNIA



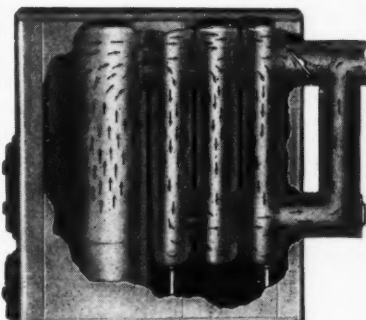
# STACK TEMPERATURE *Down-SALES GO UP*

This patented Automatic Damper is the greatest sales feature in America's most active heating market — the warm air field. And only Leader dealers have this advantage.



## HOT GASES TRAPPED

See how simply the KOOLSTACK principle works. Action of the Patented Automatic Damper prevents hot gases escaping up the chimney. Instead they are diverted through the economizer sections until every possible heat unit has been surrendered. An exclusive saving, selling advantage.



## SELL ALL *THREE*

HAND FIRED      STOKERS      OIL BURNERS

**T**HE Leader dealer meets the needs of EVERY customer, EVERY market. Because KOOLSTACK furnaces operate economically, satisfactorily, whether hand-fired, stoker-fired or oil-fired. Yes sir! There's real profit, real opportunity when you can sell ALL three. And that's exactly what the Leader dealer can do. Don't put off writing another minute. Get the money-making facts about your Leader opportunity now.

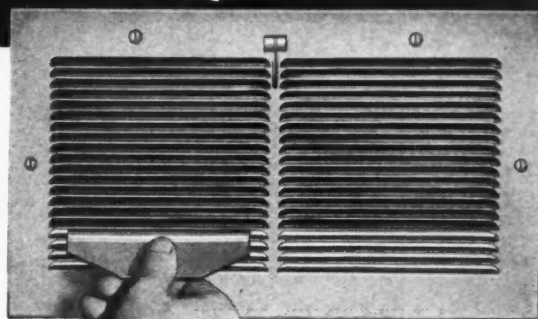


Leader KOOLSTACK furnaces available in BOTH cabinet and round-cased types. Gravity or forced air circulation optional. All welded construction. Capacities 50,000 to 200,000 B.T.U.'s.



**LEADER IRON WORKS, INC.**  
DECATUR      ILLINOIS  
2841 NORTH JASPER ST.

# INDEPENDENT WROUGHT STEEL *Air Conditioning Registers*



No. 139

## *Flexible Grille Bars Make Adjusting Easy*

This modern Independent register has attained great popularity because it presents fine appearance and high efficiency at moderate cost. The grille bars are formed of sheet metal and come regularly adjusted to direct air flow slightly downward. Being flexible, they can be bent to direct air flow to any other desired angle, upward, downward or straight outward. Materials and workmanship are of first quality. Valve is positive, free working and stays firmly in position.

*Always Leading.  
Always Progressing*



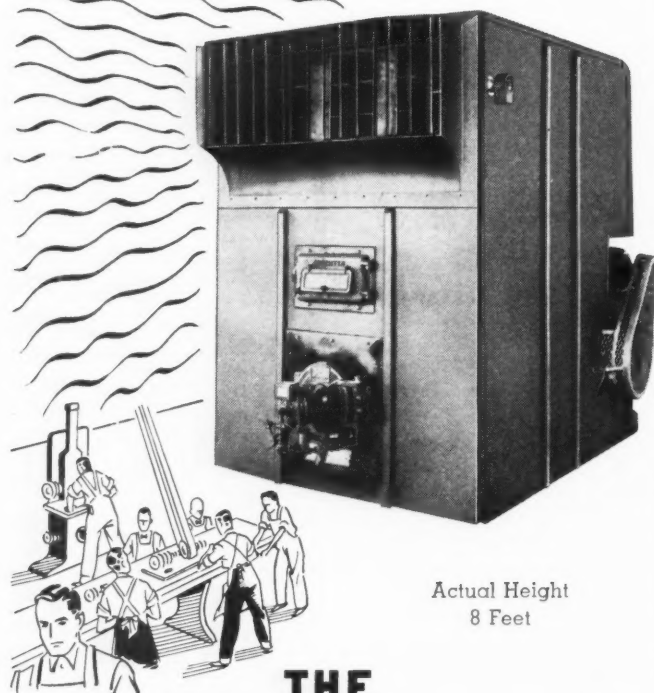
*Write for Catalog 41-AC*

## THE INDEPENDENT REGISTER CO.

3747 EAST 93rd STREET  
CLEVELAND, OHIO



**THROWS OUT THE HEAT  
FOR 200 FEET**



Actual Height  
8 Feet

## THE DIRECTHERM HEATER

distributes the heat through its forceful draftless fan system as far as 200 feet away. The entire area is equally warm—whether you stand right in front of the heater or in the farthest corner.

More than that: the Directtherm can be easily installed with low cost, requires no duct work, and utilizes about 80 per cent of the fuel energy. This is economical heat. To insure delivery for next fall, we suggest you contact us immediately.

Write for bulletin 305 Z. It gives detailed information about Directtherm—the direct-fired Unit Heater in 6 sizes (300,000—1,700,000 B.T.U.) for oil, gas or coal.

**AIR THERM**  
MANUFACTURING COMPANY

706 S. SPRING AVE.

ST. LOUIS, MO.

## New Literature

For your convenience in obtaining copies of New Literature use the coupon on this page.

### 218—Simplex Damper Regulator Sets

Ohio Products Company, 17606 Milburn, Cleveland, is distributing a small folder, illustrating and describing the Simplex damper regulator sets, the outstanding features of which are positive lock, knurled or creased—not friction held, made of steel and unbreakable, airtight, 180 deg. adjustable, and self-indicating damper position.

### 219—Hobart Arc Welding News

Hobart Brothers Co., Troy, Ohio, announces an arc welding news magazine, "Hobart Arc Welding News."

This publication will be sent free of charge to anyone writing the company's Direct Mail department and asking to be placed on the regular magazine mailing list. Editorial matter is made up from entries in the Hobart Arc Welding News Contest; letters to the editor; and articles by welding experts.

### 220—Air Velocity Meter

Illinois Testing Laboratories Inc., 420 N. LaSalle Street, Chicago, is distributing Bulletin No. 2448D with an actual size illustration of the Alnor Velometer for direct reading air velocity. There are 8 pages of illustrations and descriptions, including a schematic diagram showing some of the many uses of the "Alnor" velometer for velocity and pressure measurements of an air duct system.

### 221—Electric Motor Bulletin MU-183

The Wagner Electric Corporation, 6371 Plymouth Ave., St. Louis, recently published a new 34-page bulletin on single-phase, direct-current, and small polyphase motors manufactured by the company.

The bulletin contains detailed descriptions of the construction of repulsion-start-induction motors, repulsion-induction motors, capacitor-start motors, split-phase motors, direct-current motors, small polyphase motors, fan motors, and explosion-proof motors.

### 222—Wrought Iron, Welded Steel Pipe, Alloys

A. M. Byers Company, Clark Building, Pittsburgh, Pa., producers of wrought iron products, welded steel pipe and tubular products, as well as standard alloys and high heat resisting alloy steel—ingots, billets, slabs, bars and plates—is distributing their new 1942 general catalog.

The 1942 catalog contains 62 pages with cover, is spirally bound, and completely indexed.

The company advises that with very few exceptions they have been able to give their co-defense workers entirely satisfactory deliveries.

#### FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.  
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

27	28	29	30	31	32	33
34	35	36	37	38		
212	213	214	215	216	217	218
219	220	221	222			

Name .....

Company .....

Address .....

Are you Manufacturer—Jobber—Dealer—

## With The Manufacturers . .

### Peerless of America Moves

Peerless of America, Inc., formerly of Chicago, announces that all manufacturing facilities are now located at Marion, Indiana. The Chicago office is now located at 333 North Michigan Avenue—phone Dearborn 3500.

### Penn Chicago Office Moves

Penn Electric Switch Co., Goshen, Indiana, announces that Penn's Chicago office has moved from 844 Rush St., to 520 N. Michigan Ave. Telephone numbers remain Superior 0726 and 0727.

E. B. Maire is Chicago manager.

### Reining Represents Brundage in Chicago

Lou Reining, Chicago representative for Automatic Humidifier Company, Cedar Falls, Iowa, and Cook Electric Company, Chicago, has been appointed by the Brundage Company of Kalamazoo, Michigan, to represent them in the Chicago territory.

Brundage manufactures air conditioning units, blowers, blower housings, and skylights.

### Meyer Sales Meeting

The Meyer Furnace Company, Peoria, Illinois, held a sales meeting at their factory, January 19 and 20.

J. B. Sauer, the oldest salesman in the group is celebrating his 25th year with the company and was presented



Standing, left to right: Frank Mehrings, vice president and sales manager, Peoria; Vern Parks, Kansas City, Mo.; A. R. Lion, Kansas City, Mo.; Ray Baugh, Peoria; J. B. Sauer, Peoria, Ill. Seated, left to right: H. F. Oakes, Homewood, Ill.; C. G. Crosby, Minneapolis; George Kelly, Indianapolis; E. W. Backenstow, Muskegon, Mich.; Harry Jackson, Milwaukee; and W. P. Dennis, Cedar Falls, Iowa. L. Max Baugh was absent on account of illness.

with a handsome Gladstone travelling bag by the sales group and The Meyer Furnace Company. J. B. says "do your duty toward your Government and country, also the firm you work for, and quit singing the blues. Everything will be O. K."

### Fitzgibbons Defense Clinic

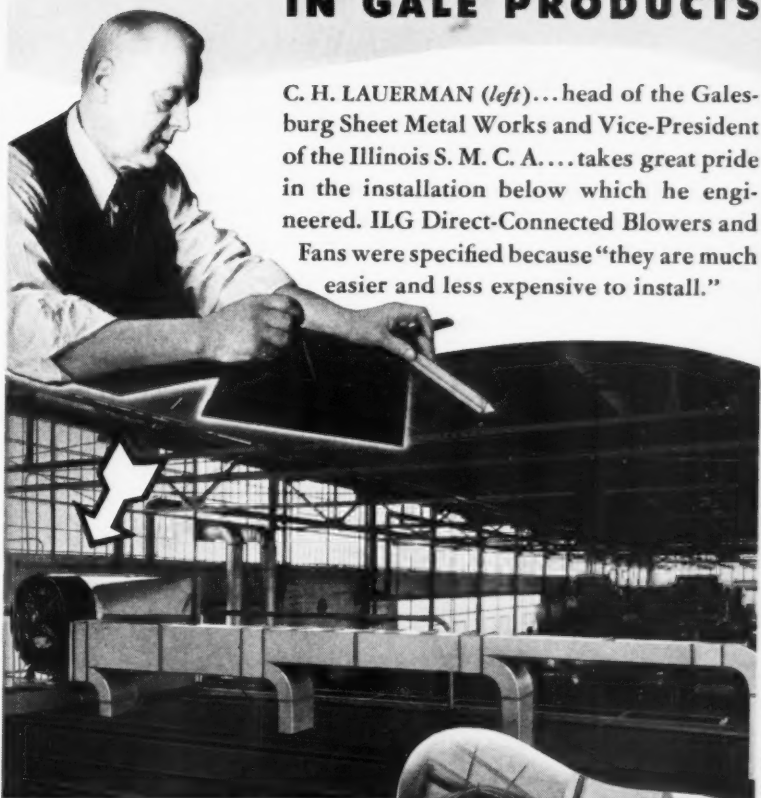
Fitzgibbons Boiler Company, Inc., 101 Park Avenue, New York City, called together a selected group of their sales engineers and branch managers on February 7 and 8, to discuss ways and means of utilizing facilities in absorbing additional defense contracts and rendering further service. An inspection of the new plant facilities was a feature.

### Minneapolis-Honeywell Educational Advertising

The 1942 advertising campaign of Minneapolis-Honeywell Regulator Company, pioneer manufacturer of controls, and its subsidiary, The Brown Instrument Company of Philadelphia, manufacturer of recording and controlling instruments, will appear in seven consumer publications and over sixty trade and professional magazines.

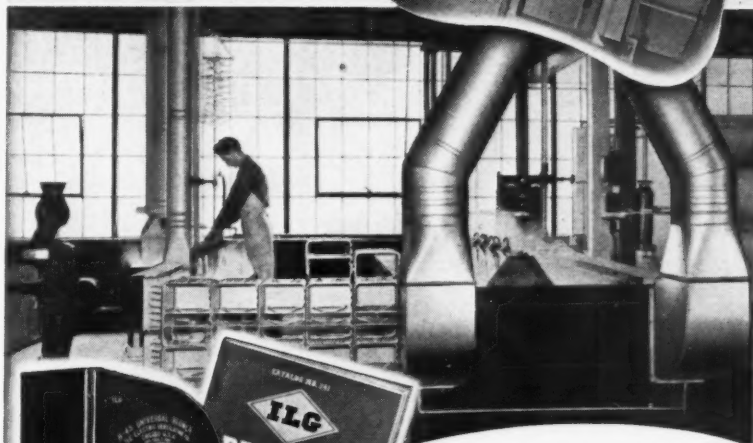
The theme this year will be directed to defense housing. The comfort and economy of automatic heating controls, even in low budget defense housing, will be emphasized. This copy will appear in American Home, House and Garden, House Beautiful, and Better Homes & Gardens, throughout the year, pages being used.

## HE PUT THE "DUCTS" IN GALE PRODUCTS



C. H. LAUERMAN (left)...head of the Galesburg Sheet Metal Works and Vice-President of the Illinois S. M. C. A....takes great pride in the installation below which he engineered. ILG Direct-Connected Blowers and Fans were specified because "they are much easier and less expensive to install."

HEAT, ODORS, FUMES from Infra-Red drying room (interior view at right) at Gale Products Plant, Galesburg, Ill., are rapidly removed by ILG Blower (above). Other ILG Propeller Fans on roof exhaust fumes from spray booths.



FREE CATALOG AND DATA BOOK  
Ask for No. 241

"WE WOULD NOT HESITATE to recommend similar installations to anyone," says C. P. Rossberg, manager of Gale Products. "ILG Fans and Blowers in our plant are operating very effectively." In addition to the Blower for the drying room, ILG Blowers and Self-Cooled Motor Propeller Fans remove toxic vapors from the tanks in the plating vat department (above) . . . All ILG equipment has "one-name-plate" guarantee—complete unit, including motor, designed and built by ILG.

ILG ELECTRIC VENTILATING CO., 2871 N. CRAWFORD AVE., CHICAGO, ILL.  
OFFICES IN 41 PRINCIPAL CITIES CONSULT YOUR PHONE DIRECTORY



Vitalized Ventilation

AND AIR CONDITIONING

AIR CHANGE . . . NOT JUST AIR MOVEMENT!



## Ohio's 1942 Convention

(Continued from page 81)

buying or will buy from our industry are the construction corps, the medical corps, the chemical warfare industry, the signal corps. All of these are purchasing through Procurement Offices. Competition will remain keen in the sheet metal fabricating field, but the quantities required are so enormous for a five million man army that Washington believes eventually almost every medium sized shop with some power equipment can take these contracts.

### Conservation of Man Power

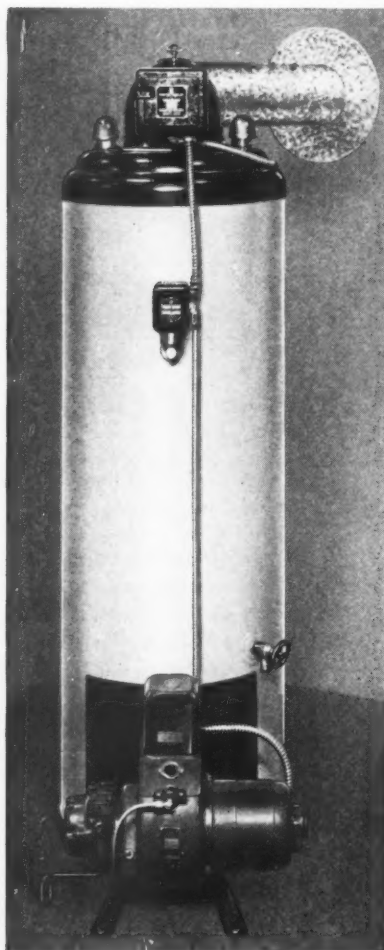
A. D. Caddell, Division of Safety and Hygiene, Industrial Commission of Ohio, outlined some of the essential steps industry must consider in changing over from a peacetime to a wartime basis. Foremost in these measures is adequate provision for the safety of the employees in order that manpower may be conserved. According to the speaker, in 1941 approximately 105,000 lives were taken in industrial and home accidents. More than 9,000,000 persons were injured and \$3,750,000 was the total of these accident costs. In Ohio alone, more than 285,000 applications for accident benefit funds were received by the Commission in 1941 to a total of more than 9,500,000 man-days lost due to accidents.

The speaker emphasized that industry can not blame these industrial accidents on new types of machines, nor high speed machines, or new methods of production; Ohio records show that only 15 per cent of job accidents are directly traceable to mechanical

failures, whereas 85 per cent are directly traceable to personal carelessness. The six chief causes of accidents in Ohio were listed as (1) machinery; (2) handling of objects; (3) falls; (4) injury from striking objects; (5) injury from hand tools; (6) injury from flying objects. Accident prevention bureaus in all states are trying to reduce the accident rate, but management must take an immediate and direct hand in this program of accident reduction. Changing and shifting employment as well as the employment of older and younger persons; also the employment of women and persons not previously in industrial employment offers a tremendous problem which management alone can solve.

### Priorities

G. A. Moore, Field Service Department of War Production Board in the Cleveland Office asserted that the whole tempo of War Industrial production has picked up tremendously since Donald Nelson took charge of the WPB. Priorities now are touching more men and more businesses intimately than any other single order and will increasingly do so as time goes on. Said Mr. Moore, the chief purpose of priorities is to get first things first, but it follows that last things last is probably the reason why most industries find many problems under priorities regulations. An interesting statement by Mr. Moore was that priorities should promote thrift—thrift of manpower; thrift of products; thrift of raw materials. Priorities have become a check upon American wastefulness and the speaker expressed the opinion that he believes after the war the nation won't leave the sensible way of living and utilizing our resources which we are now becoming acquainted with to revert to our former



## For Satisfied Customers..

● A COMPACT boiler burner unit designed for domestic hot water supply—duplex houses, clubs, apartments and commercial uses, with rated output capacities up to 150,000 Btu an hour—that is the

### AQULUX

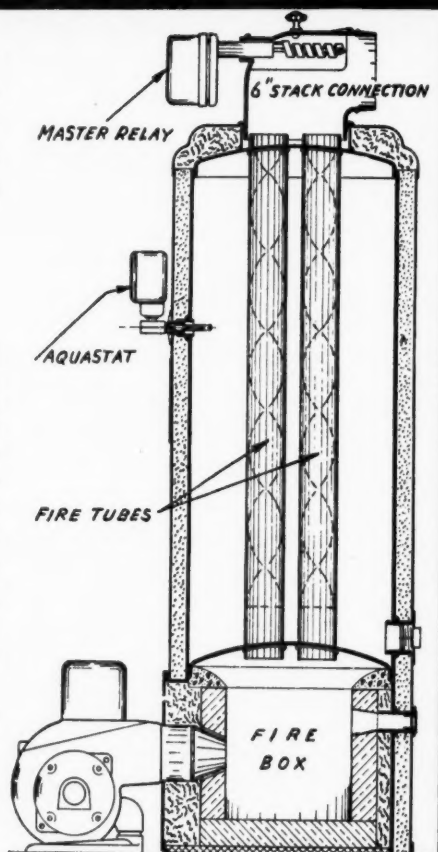
● Made in two sizes No. 85 and No. 150 by the S. T. Johnson Co. Because of the rapid recovery of the powerful Bankheat Oil Burner no storage tank is needed beyond that of the units themselves, except in large apartments and for some commercial uses.

Standard specifications include — 10 gauge copper steel shell and 3/16" steel head, hot dipped galvanized inside and out; refractory firebox; master control and aquastat; draft adjuster; insulated ivory enameled jacket with green trim; burner and control wiring in flexible conduit for easy installation.

Complete specification and installation data sent anywhere on request.

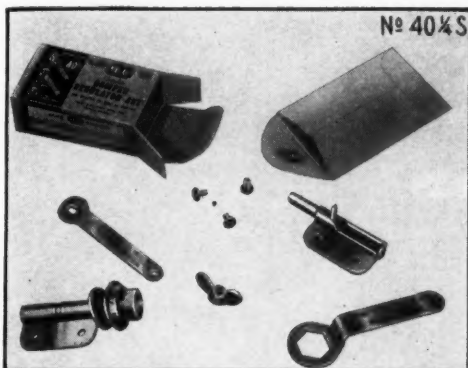
**S. T. JOHNSON CO.**

940 ARLINGTON, OAKLAND, CALIF.  
401 BROAD ST., PHILADELPHIA, PA.





## H&C DAMPER REGULATOR SETS



No. 40-1/4S  
A SUPERIOR  
LOW COST  
SET

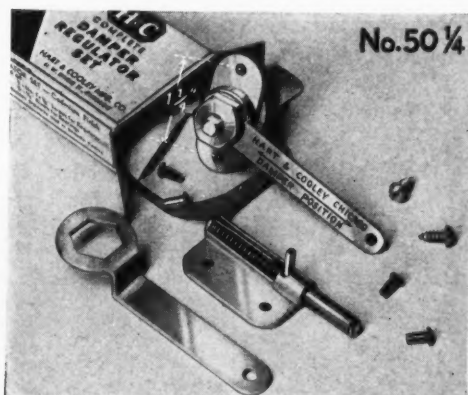
The finest, most convenient Damper Regulator Set in its price class. Furnished complete with handle—the only convenient means of adjusting damper. Handle always indicates position of damper (Patent No. 2,146,142). Furnished with rattle proof snap bearing and with both wing nut and hexagonal lock nut to suit all conditions.

Made only with 1/4" bearings. LIST PRICE.....30c

### BRACKET TYPE

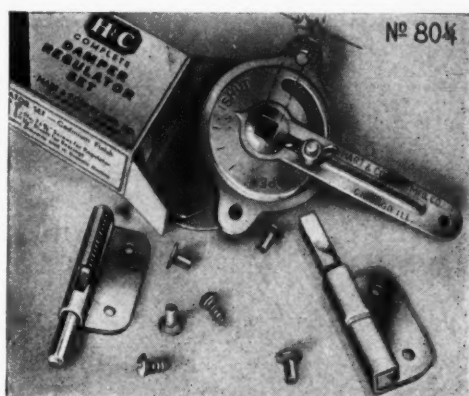
No. 50-1/4

No. 50-3/8



First choice of a great many installers. Furnished with same type of positioning handle as No. 40-1/4S. Handle may be used over lock nut and removed for tamper-proof setting. Furnished with rattle-proof snap end bearing in 1/4" size; solid bearing on 3/8" size. Packed complete in carton.

LIST PRICES—No. 50-1/4.....40c; No. 50-3/8.....60c



### DISK TYPE

No. 80-1/4

No. 80-3/8

A fine quality built set which is still the favorite of many installers. Like all H&C sets all parts are rust proofed and are equally adaptable to splitter or regular dampers.

LIST PRICES—No. 80-1/4.....40c; No. 80-3/8.....60c

See your jobber or write for literature and sample.

**HART & COOLEY MANUFACTURING CO.**  
Holland, Michigan — Chicago Office at 61 W. Kinzie Street

*don't  
forget*

# HUSSEY COPPER

IN THOSE  
NEW DESIGNS



The same alert organization and broad production facilities that are rushing top quality Hussey Copper for every Ordnance requirement today will be ready to supply your normal copper needs better than ever when tomorrow comes. In your new designs for "production when possible" . . . count on Hussey Copper.

Copper **HUSSEY** Brass

**C. G. HUSSEY & COMPANY**  
(Division of Copper Range Co., Miners and Refiners of Pure Lake Copper)  
Rolling Mills and General Offices: PITTSBURGH, PA.



wastefulness.

American industry and American arms now find themselves up against two of the finest war teams in all history; teams which have been building war equipment for many years; training men from boyhood up; and America is finding that simply passing large appropriations or letting big orders is not the way to win the war. The war can be won only by every man and every industry pitching in to do its share; by forgetting for the moment petty squabbling over politics, quibbling over personal power, and the public attitude of every man for himself first. Industry should anticipate that as the war goes on, materials which up to now have been comparatively easy to obtain will become more scarce as higher and higher ratings take materials which up to now have been obtained under low A and high B ratings. Construction of industrial or commercial buildings and houses will probably, as 1942 proceeds, become more and more construction for war; but Washington is not now overlooking the importance of proper maintenance and in the speaker's opinion materials and equipment will be provided for suitable maintenance. The speaker then analyzed and discussed some of the regulations.

#### Ladies Activities

The Ohio ladies were by no means forgotten. A get-acquainted tea was tendered on the first day of the meeting; the ladies were invited to the boxing matches on the first evening, and of course were much in evidence for the floor show, banquet and dancing. The Cleveland Ladies Committee consisted of Mrs. D. A.

Mannen, Chairman, Mrs. M. J. Cutter, Mrs. Ed Fasinger, Miss Polly Thesmacher, Mrs. Arthur Franck, and Miss Rita Mannen.

#### OFFICERS

President—Carl M. Gundlach, Sandusky  
Vice President—Clarence Christen, Toledo  
Treasurer—D. A. Mannen, Cleveland  
Secretary—A. E. Bogen, Columbus

#### DIRECTORS

Joseph Dersher, Toledo  
Charles Lentz, Canton  
Harvey L. Orton, Akron

### National Housing Agency

(Continued from page 82)

with respect to defense housing for families except units on military or naval reservations, posts, or bases; functions of the Farm Security Administration and any other agencies providing temporary shelter in defense areas; functions of the Farm Security Administration relating to housing for families not deriving their principal income from operating or working upon a farm; the Defense Homes Corporation; functions of the United States Housing Corporation now in process of liquidation; functions and powers of the Division of Defense Housing Coordination and of the Coordinator of Defense Housing.

Steel Rod

Sharp Piercing Point with Four Cutting Edges

Rod may be used as Punch on Heavy Furnace Pipe

Has Arrangement for keeping Spring and Ferrules in Place when Rod is Out of Blade

Heavy Cast Reversible Blade  
BUY ADAMS KNOWN QUALITY

Extra Heavy Tinned Spring

Ferrules and Coil Handle Bright Nickel Plated

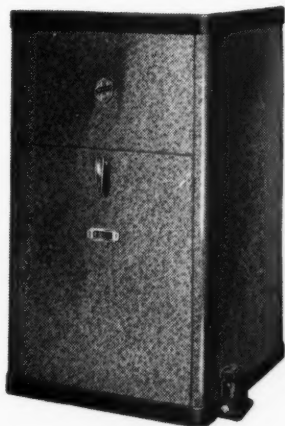
CAST ROD desirable when subject to Extreme Heat

**DIAMOND SMOKE PIPE DAMPER**  
Manufactured by **THE ADAMS COMPANY** Dubuque, Iowa, U.S.A.  
ESTABLISHED 1883

# New MONOGRAM

## VICTORY MODEL OIL BURNING FURNACE

For Low Cost Defense Home Heating



**MODEL No. 73**  
Manually Operated  
Gravity Oil Furnace

Insulated cabinet, one-inch Fiberglas,  $26\frac{1}{4} \times 26\frac{1}{4} \times 50\frac{1}{4}$  inches high. 18-gauge combustion drum with exclusive MONOGRAM double baffle feature, made possible by a shorter, wider flame of the MONOGRAM patented Turbulent Flame Burner. 53,000 BTU output, finished

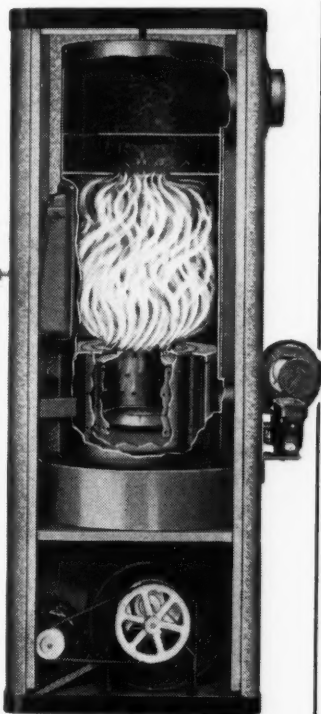
in brown ripple, heavy, durable construction.

**MODEL No. 74**—Same size and specifications as Model No. 73, illustrated above, except that it is equipped with the exclusive MONOGRAM Trimatic rheostat control which can be recessed in the floor above furnace or mounted on wall. This dial controls the oil input to the burner and controls the R.P.M. of blade fan, which provides mechanical draft and also boosts circulation and heated air. 63,000 BTU output.

### MODEL No. 104

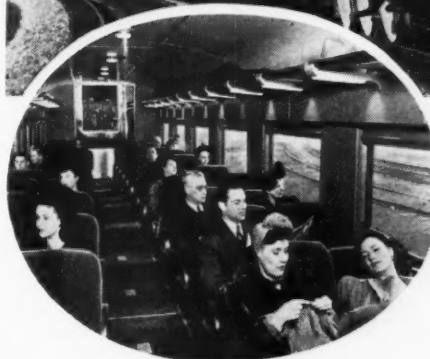
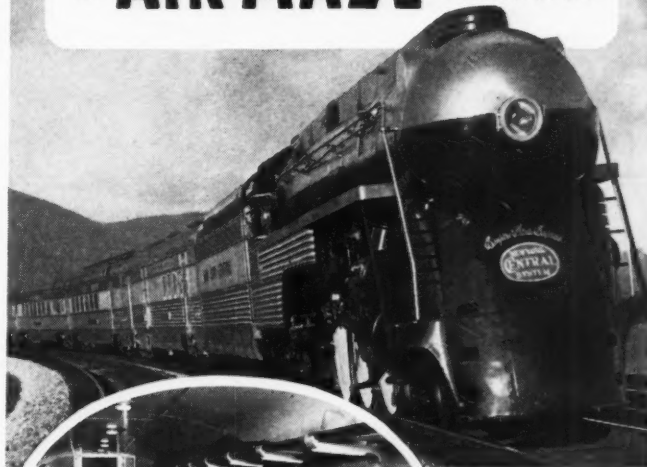
*Upright Full Forced Air  
Oil Burning Furnace*

Insulated cabinet, one-inch Fiberglas,  $27 \times 27 \times 66$  inches high. 18-gauge combustion drum with exclusive MONOGRAM double baffle feature made possible by a shorter, wider flame of the MONOGRAM patented Turbulent Flame Burner. 70,000 BTU output. Limit control and blower switch. AP thermostat with oil-air control. Separate mechanical draft blower which operates only on high fire. Rex air control and blower for forced circulation. Filters and humidifier, extra.



**The Quincy Stove Mfg. Company**  
QUINCY ILLINOIS

## Empire State Express IS AIR-MAZE PROTECTED



(New York Central System)

(New York Central System)

One of the two Empire State Express Super-streamliners conceded to be the world's finest day trains, costing almost \$2,500,000.00 to build. Equipment of the luxurious cars includes summer and winter air conditioning with capacity for complete change of air in each car in four to six minutes. The filters are AIR-MAZE.

• Celebrating its golden anniversary, the famous Empire State Express has replaced its previous equipment with two new super-streamlined trains. Built of stainless steel by the Edward G. Budd Manufacturing Co., Philadelphia, these new trains are equipped with every modern device for the protection and comfort of the passengers, including winter and summer air conditioning.

For the highly important function of cleaning and purifying the air in these luxurious streamlined cars, AIR-MAZE Permanent Air Filters were selected. This choice was based on the demonstrated high efficiency of AIR-MAZE as well as on the ease with which AIR-MAZE filters are restored to their original high peak performance.

Car maintenance shops along the route are provided with duplicate spare sets of AIR-MAZE filter panels so that while one set is in operation, another is being cleaned and prepared for further service. Thus, these twin super-streamliners are always assured top notch filter performance with minimum effort and loss of time.

This outstanding recognition of AIR-MAZE advantages is further evidence of the complete adaptability of these permanent air filters to every air conditioning requirement.

May we help you on your air filter problem?

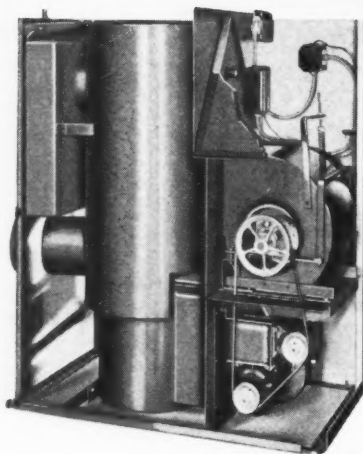
**AIR-MAZE CORPORATION**  
5130 Harvard Avenue Cleveland, Ohio





*There's No* **PRIORITY** *on*

# ECONOMY



## CONCO OIL-FIRED M-1 AIR CONDITIONER

Magic Spray Regulator — Magic Hand Controls — Efficient, Economical operation — Trouble-free — Long lived — Completely automatic — 3 models.

Both Uncle Sam and your prospects want to cut fuel consumption. There's no priority on economy! That's why now, more than ever before, the economy of the Conco Burner is a vital selling point. A Conco Airconditioner or Conversion Burner serves in these ways: 1. Its famed Magic Spray Regulator cuts fuel costs to the bone. 2. The higher quality construction of the Conco unit eliminates early repairs or replacements — cuts service calls. 3. Because these units are completely packaged, they are easily, quickly installed at a maximum profit for you. Write today for full details on the Conco line of coal, oil and gas-fired heating and airconditioning equipment.

Two Units — Two Models — All Sizes



### CONVERSION BURNER

Models for small homes up to large apartments.

### OIL AIR-CONDITIONER

Models for small, medium or large homes.



**WRITE FOR IT TODAY!**

## CONCO CORPORATION

COAL OIL AND GAS HEAT  
MENDOTA, ILLINOIS



Make Summer - time  
your profit - time.  
Conco's "Summer  
Sales Plan" tells you  
how!

**CONCO'S  
SUMMER  
SALES  
PLAN FOR  
DEALERS**

↓  
**CONCO  
OIL-FIRED  
EQUIPMENT**

↓  
**WITH MAGIC  
SPRAY BURNER**

↓  
**MAGIC HAND  
CONTROLS**

By MINN.-HONEYWELL

↓  
**SERVES HOMES  
up to 12 ROOMS**

↓  
**COMPLETELY  
PACKAGED**

## *New* SERIES No. 3 **NIAGARA POWER SQUARING SHEARS**

Series No. 3 Niagara Shears operate at 80 strokes per minute. High production squaring and trimming are assured by the instant-acting sleeve clutch, quick, accurate gaging and convenient operation.

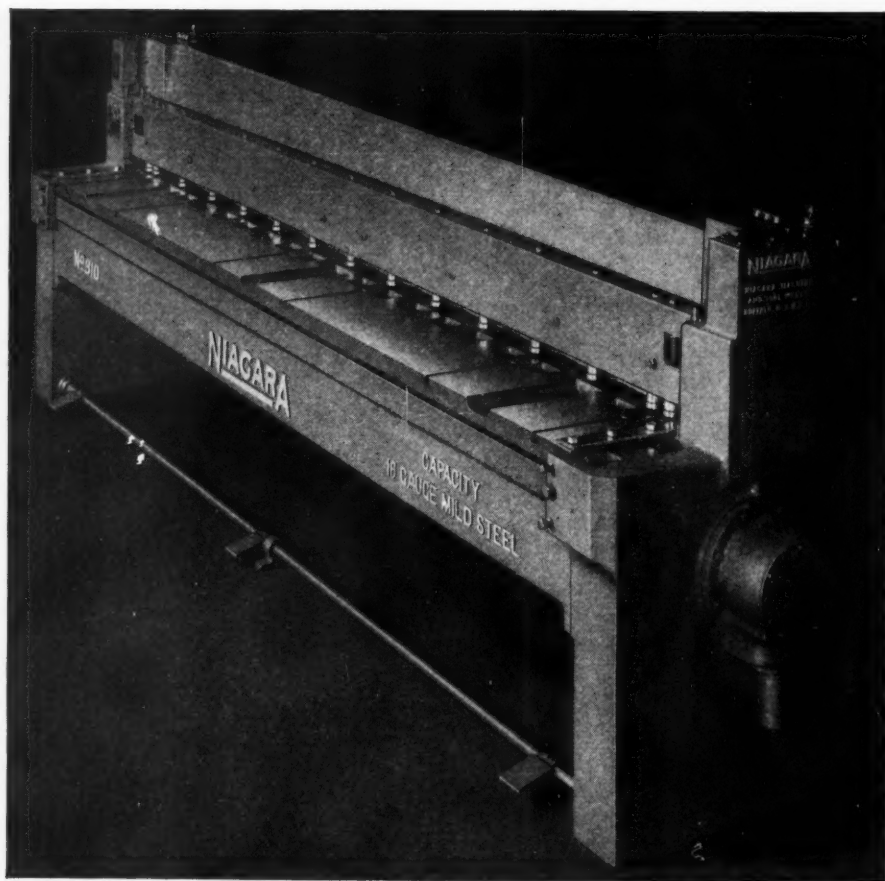
They cut sheared edges and narrow strips straight to within a very few thousandths of an inch.

Motor is direct connected and drive is enclosed in oil tight case.

Standard equipment includes ball-bearing, self-measuring parallel back gage, front and side gages, and four edge, solid tool steel knives.

\* \* \*

Niagara Machine & Tool Works,  
Buffalo, N. Y., Cleveland, Detroit,  
New York.



Capacities: 14 to 18 Gage. Cutting Lengths: 4 to 12 Feet

## Fundamentals of Small Stoker Operation

(Continued from page 56)

the chimney.

- d. The hand turn damper may be partially closed.
- e. It may be thought that the stoker is operating normally, but there may actually be more blast on the forced draft than should be used.

For satisfactory operation the flames should not come out of the open door. If condition c, d, or e, or a combination of them is present, the trouble should be corrected before work of installation proceeds.


### Adjusting the Natural Draft Control

Assuming that conditions a and b are not present and that conditions c, d, and e, have been corrected, work with the same fire as described above. Check the natural draft until the flames near the open fire-door appear to start toward the door as though they intended coming out, but just before they get close to the outer edge of the door they appear to change their mind and return into the fire-box. The natural draft that makes flames behave like this is the minimum that should be used and yet it is ample. With the barometric control adjusted to give these conditions in the fire-box, the natural draft is adjusted properly, within commercial limits, for the different changes of load on the stoker.

The stoker service man who is familiar with the use of a draft gauge knows that under the operating conditions described above a natural draft in the fire-box of .05" is ample, and, when the stoker has been operating steadily for more than an hour, the natural draft should not exceed .08" to .09". In mild weather with low fire conditions natural draft in the fire-box should not exceed .02" to .03".

If a draft gauge is used to determine the strength of natural draft, a small steel tubing with an outside diameter of 1/8-inch should be inserted through the shutter in the fire-door and through a hole in the baffle plate back of the shutter. If there are no available holes through the fire-door and baffle, the steel tube can be used as follows: about 8 inches from one end of the tube bend it at right angles, being careful not to close the opening in the tube. Two inches or so from that bend make a second bend at right angles. From the second bend to the end of the tube should be 3 or 4". The opening in the end of this short piece should look in the opposite direction from the opening in the end of the 8" length. A small tube of this kind can be placed between the fire-door and the door frame at the side opposite the hinge. The 1/8-inch crack will not seriously affect the draft readings.

Without a draft gauge the stoker man or the owner by using some patience and observation,

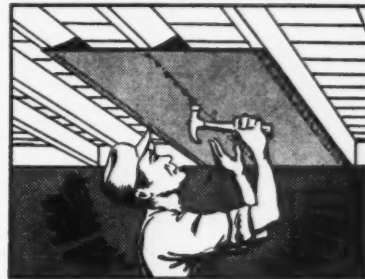


# ARA

ASBESTOS • RETURN • AIR

## SHEETS

NATIONAL DEFENSE REGULATIONS SERIOUSLY RESTRICT THE USE OF METAL FOR RETURN AIR DUCTS. CONSERVE METAL! Use A. R. A. Sheets for Return Air, Ventilating and Air Conditioning Ducts, Casings, Cabinets, etc. A. R. A. is a strong board having a K factor of .45 B.t.u. about 3/16" thick, weighs about 1/2 lb. per square foot, and is m in sheets 33"x48" and 16 1/2"x48". Here are some of its outstanding features.



### RIGID

A. R. A. Sheets are rigid yet not brittle, will "drape," fold up, bend or twist. One man easily handle the sheet.



### TOUGH

A. R. A. Sheets are really tough. You can't tear 'em, and you can't break 'em. They are Mullen Tested (bursting) over 200 lbs. per square inch.



### FIREPROOFED

Completely Asbestos-clad, A. R. A. Sheets give you a strong easy-to-handle sheet which has been tested and approved as the safest all around sheet of its kind.



### LIGHT

Altho A. R. A. Sheets weigh only 1/2 lb. per sq. ft., special design and construction give it great strength and rigidity, making A. R. A. a smooth, durable, waterproofed, lightweight sheet.



### STRONG

A. R. A. Sheets will not dry out, crack, crumple or chip. You can depend on their strength lasting service.



### CUTS EASY

A. R. A. Sheets can be cut into any desired size or shape easily with your regular snips, saw, or sharp knife.



Write for Samples and Information

# GRANT WILSON INC.

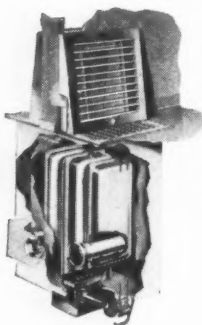
4101 WEST TAYLOR ST., CHICAGO, ILL.



**WHY I'M GLAD  
I SELL PAYNEHEAT**

## Payne BACKS ME UP WITH A CRACK REGIMENT OF SALES BUILDERS

PAYNE has planned and is carrying out far-flung "field maneuvers" to help every Dealer and Gas Company sell PAYNEHEAT. ★Nationally recognized as top-flight designers of gas heating, PAYNE also knows sales-engineering. We back you up with advertising, both local and national. Our "ammunition": space in magazines, literature, display material, promotion ideas... even individual service to solve *your* special sales problem. ★Let our regiment of advertising support help you build your future with PAYNEHEAT.



In the Emergency, our order of delivery is as follows: (1) U. S. Defense needs; (2) Established Payne Dealers' orders; (3) New business. For further information we cordially invite you to write J. H. Keber, Sales Manager.

**PAYNE Duplex Furnace.**  
One of the versatile 69 models and sizes produced by PAYNE. All are double-tested: AGA plus PAYNE Testing Laboratory.



**PAYNEHEAT**

MORE THAN A QUARTER-CENTURY OF SPECIALIZATION

Payne Furnace & Supply Co., Inc., Beverly Hills, California

can adjust the natural draft in the fire-box by proceeding as previously described. With a little care he can get as good an adjustment as is possible to get by the use of a draft gauge.

Should the movement of gases from the fire-box become sluggish after a period of operation with controlled natural draft, one of these suggestions may help locate the cause:

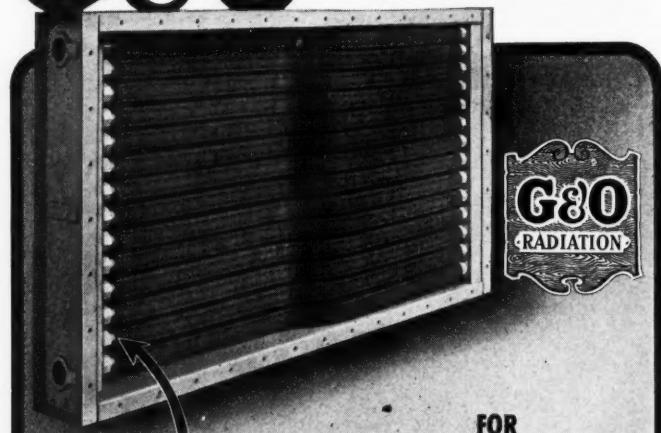
- (1) Fly-ash may have accumulated in the gas passages of the heater, in the smoke pipe or in the chimney.
- (2) There may not be sufficient draft at the chimney because the chimney is too cold, some obstruction has closed off part of the flue, or air may be entering the chimney from some other source.
- (3) The draft regulator may be sluggish in operation, and need cleaning of bearings and movable parts.

### Chicago Filter Co. Representatives

The Chicago Filter Company, Joliet, Illinois, manufacturer of Tampico air filters, announces the appointment of the following representatives:

Wallace Agey, Kansas City, Missouri.  
Barger Equipment Company, St. Louis.  
Edwin C. Anderson, Denver, Colorado.  
G. M. Craig Company, Minneapolis.  
L. V. Fox Co., Inc., Washington, D. C.  
L. F. Pease, New York City.  
A. A. Nemec Supply Company, Indianapolis, Indiana.  
Fred H. Sides, Charlotte, North Carolina.  
John E. Brecht, Cincinnati.  
Whitney & Company, Cleveland.  
John L. Underwood, Atlanta, Georgia.

## G&O COILS



FOR  
HEATING AND COOLING  
IN  
A WIDE RANGE OF SIZES



Detail of mechanical joint  
used in Universal Heat  
Transfer Coils.

Send for Catalog

**THE G&O MANUFACTURING COMPANY**  
New Haven, Connecticut

Pioneer Manufacturers of Square Finned Tubing in the United States



## Twin City Furnace Co. Methods

(Continued from page 45)

Canvassing, telephone solicitation and cleaning "campaigns" are not used by Twin City to get old house work. Instead, a card mailing plan is used, principally to old customers. This card mailing calls attention to the services offered; to the advantage of having furnaces repaired and improved. More than 20,000 old customer names are in the files of the firm today and these old customers are actively solicited.

The company also uses space in the classified telephone book; takes space in cooperative displays of the local gas company; and once each 60 days inserts a small advertisement in local papers. Salesmen are given building reports and permits to follow up. Last year trial was made of radio advertising over a local station—the results were not too good and not too bad.

By these means a total dollar volume of approximately \$40,000 per year is sold in the old house field.

### Van Alsburg, Hart & Cooley to Navy

Hart & Cooley Manufacturing Co., 61 W. Kinzie St., Chicago, announces that the Government has requested the service of J. H. Van Alsburg and that he has been given a leave of absence. Mr. Van Alsburg is assigned to the Navy Department, Bureau of Ships.

## THESE ARE *Your Customers!*



**YOU'LL SELL THEM FASTER  
WITH**

**HESS  
QUALITY EQUIPMENT**

Defense workers, bankers, salesmen—these are your customers—people who appreciate the precision craftsmanship of the HESS line of quality heating equipment. You'll profit by HESS' financing and territory plan.

**DEALERS:**

Write TODAY for New 1942 Portfolio!

**IN 1942 FEATURE—**  
selling, modernizing, replacements and repairing with

- ★ HESS Blower Filter Units
- ★ HESS Welded Steel Furnaces
- ★ HESS Automatic Oil Burners
- ★ HESS Automatic Coal Stokers

Quality Equipment from HESS  
Costs Less!

**HESS WARMING & VENTILATING CO.**  
1211 S. Western Avenue CHICAGO, ILLINOIS  
Founded 1873

## ★ ★ ★ ★ ★ HOW TO SOLVE HUMIDITY PROBLEMS FOR DEFENSE HOUSING AND ARMY CAMPS

### FOR

### MANUFACTURERS

Maid-O'-Mist Humidifier Valves provide the best answer for defense housing furnaces. Low in cost they give dealers and contractors an extra value that wins the sale. For larger furnaces with forced air circulation we recommend use of Maid-O'-Mist pan or convector type humidifiers. Before you buy investigate Maid-O'-Mist and save.

### FOR

### CONTRACTORS

Low first cost, easy installation and trouble free operation have made Maid-O'-Mist ace high with heating contractors. For defense housing use Maid-O'-Mist to get the job.

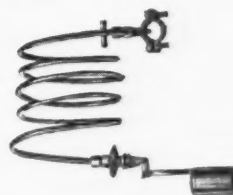
### No. 8856 STEEL PAN AUTOMATIC HUMIDIFIER



A highly efficient pan type automatic humidifier, designed for air conditioning furnaces where either high or low bonnet temperatures prevail. Furnished complete with black enameled steel pan, reservoir and removable front hood plate, 6 ft. of plastic tubing with saddle valve. Equipped with a No. 56 water feeder valve. Made in 26 and 36 in. lengths.

### No. 50-F WATER BOY MIDGET FEEDER

Makes manual bucket or pan type humidifiers completely automatic. Particularly valuable where space is limited. It is only 7 in. long overall and operates in water only 1 in. deep. Simple and easy to install, and provided with adjustment. Made entirely of non-ferrous metals and furnished with or without saddle valve and plastic tubing.



### No. 59-F WATER BOY FEED VALVE

This unit converts any hand fed pan into an automatic humidifier. Easily and quickly installed. Non-back siphoning supply valve. Float adjustable for varying water pressures. Furnished either with or without saddle valve and plastic tubing.

### No. 57 AUTO FEEDER

Equipped with self-closing, removable valve unit with special heat and oil resisting seat. Valve unit can be replaced with ordinary tire valve.



★ For full information on the complete Maid-O'-Mist Line consult your American Artisan Catalog Directory or write for Catalog Sheet No. 701.

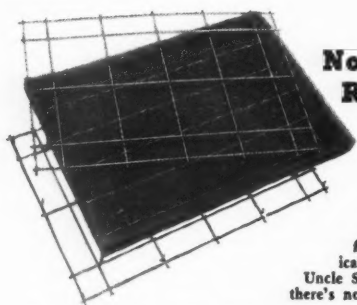
**MAID-O'-MIST INC.**  
**AUTOMATIC HUMIDIFIERS**  
FOR ALL TYPES OF HEATING SYSTEMS  
213 NORTH ABERDEEN STREET  
CHICAGO ILLINOIS

# Make Your Service Calls Easy and Profitable with **RiP-CLEAN** AIR FILTERS!

**Use Triple-Life  
RiP-CLEAN Filters  
To Sell Repair Jobs**



Make your profits . . . by making more repair inspections and selling more jobs! RiP-CLEAN Air Filters help you do all this. RiP-CLEANS have the **EXCLUSIVE** feature which triples dust holding capacity . . . maintaining 93% dust removal efficiency. These fine filters seal themselves to duct walls . . . end air by-pass. And with a selling story like this . . . of course you'll get extra profits with filter sales!



**No. 200 SERIES  
RE-FIL-ABLE  
RiP-CLEAN  
FILTER**

When this filter gets dirty, two layers are torn off, and pad is replaced in wire frame. These filters contain almost no critical materials — waste none of Uncle Sam's precious metals . . . and there's no expensive frame to salvage.

Learn How You Can Have the Extra Profits with Research RiP-Clean Air Filters! Write Us Today!

## RESEARCH AIR FILTERS

**RESEARCH PRODUCTS CORP.,  
MADISON, WIS.**

## Kruckman Sub-contracts

(Continued from page 38)

that do not agree with the Nelson opinion, seize the opportunity to make their opinions felt by active as well as passive means. That is the reason why you, out all over the United States, as well as we, here, near the fountainhead, are utterly bewildered by the conflict in actions and information originating from people in the same organizations. We must suffer these headaches until Nelson again completely wins his point, or compromises on a settlement.

In theory you are able to go to any WPB headquarters wherever it is located and arrange to secure some war work. The theory is that production is so urgent that almost any capable producer can find something he can do. At the end of this letter you will find a list of a large number of articles repeatedly purchased by the Army, the Navy, the Lend-Lease agencies, and others, which apparently should offer opportunities for production in shops of almost any size.

It is certain we will have approximately 9,000,000 men in the Army and Navy by the end of 1943, and upwards of 25,000,000 persons at work in war industries, according to responsible government sources. That would seem to mean the need for production of the bits and pieces and other smaller things by smaller prime contractors will grow constantly.

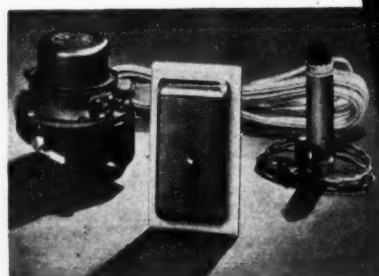
The Army and Navy people will tell you no matter how small the shop is, it should be able to secure a direct order. They tell you also that direct prime contracts are given for many jobs that are far less

**NOW MORE THAN EVER BEFORE  
GENERAL all gas CONTROLS  
MEET DEFENSE HOUSING  
SPECIFICATIONS 100%—here's how!**

**FIRST:** because the low cost of General Controls automatic gas heating controls brings them within the most modest new or modernized home heating budget.

**SECOND:** because no electricity is needed and because their design reduces the amount of critical defense materials used, General all-gas controls make for easy and simplified installations that everyone can understand and enjoy. Write for details.

WRITE FOR NEW COMPLETE  
CATALOG — Just Off The Press!



**Everything  
YOU NEED FOR AUTO-  
MATIC GAS HEAT IN A  
PACKAGE. This G. C. set  
includes new B-60 Series  
Gas Valve, pilot genera-  
tor, new Trimtherm and  
30 ft. of wire.**



## GENERAL CONTROLS

801 ALLEN AVENUE • GLENDALE, CALIFORNIA  
Branch Offices: Boston • New York • Philadelphia • Atlanta • Cleveland  
Detroit • Chicago • Kansas City • Houston • Dallas • San Francisco

in dollar volume than \$25,000 each. It is impressed upon you that there is no longer need for delay, for the circumlocutions or earlier investigations at a distance, for advertised bids. In theory, at least, you are supposed to walk into an Army or Navy procurement office—any of them anywhere being able to purchase \$1,000,000 worth or less—and make a deal to take on a job by the simple process of striking a bargain. Nelson has said that the cost is wholly secondary to production, speed.

#### You Can Get Work and Financing

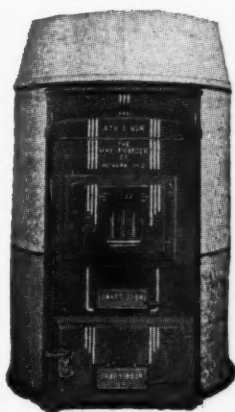
Moreover, in theory, you no longer are supposed to make the rounds hunting for the work, for the latest Nelson order—they call it "directive"—tells WPB employees they must go out in the highways and byways and find the smaller industrial units that can produce, and when they find them they are instructed to put them to work at anything within the scope of their facilities. If they need funds to get started, they can secure 30 per cent of the total price of the job in advance. If they need new machinery, the problem is a little more difficult, unless the job they are to do is urgently important. By and large, the shop or factory with the best facilities and the least need for additional machinery or equipment gets the best break.

In theory, also, you are supposed to be able to find the way to this business in any town or city where there is a WPB office. There are between 300 and 400 WPB offices scattered around the country, and the approach to the work should therefore not be very difficult. The supposition is that the WPB offices should be able to tell you what the jobs are, or should

## 50 YEARS OF LEADERSHIP *The Time-Tested* ATH - A - NOR

Furnaces, like any other piece of merchandise, are only as good as the people who make them. The May-Fieberger Company has been making the ATH-A-NOR Furnace illustrated for over fifty years, and the fact that it will perform with unusual efficiency and economy is backed up by hundreds of satisfactory installations.

If you've been looking for a fast-moving, top performing gravity furnace to round out your line, investigate the ATH-A-NOR now! A postcard request will bring literature.



- QUALITY
- ECONOMY
- EFFICIENCY

... write today  
for further information!

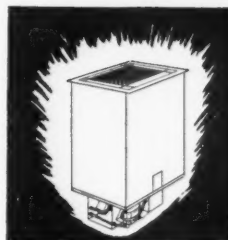
MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS

# MAY-FIEBERGER COMPANY

NEWARK

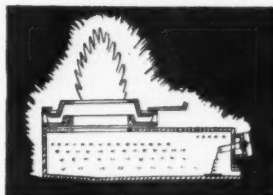
OHIO

## How to Solve the Small-Home Heating Problem



### OIL-BURNING FLOOR FURNACE GIVES LOW-COST HEAT!

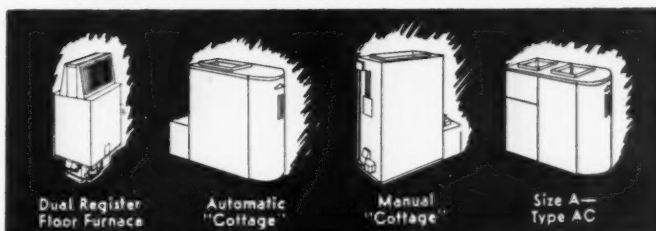
Here's a very compact and practical oil-burning furnace, completely assembled at the factory, ready to install right in the floor. Saves time, metal and space. NO warm air pipes, NO cold air returns, NO basement needed. Factory guaranteed. Offers years of trouble-free service. Burns cheap No. 3 furnace oil. NO soot, NO smoke, NO noise. Listed by the Underwriters' Laboratories. Only unit of its kind with Manual Control or Automatic Operation, Electric Ignition and Thermostatic Control.



### AMAZINGLY SIMPLE BURNER HAS NO MOVING PARTS

All our units have the trouble-free H. C. Little Burner, the only vaporizing burner with fully automatic operation and electric ignition . . . the ideal burner for small-home use. It's Safe, Silent, Clean and Economical. Operates on patented principle of Progressive Low Temperature Carburetion. Has no pilot light to smoke or go out . . . no moving parts . . . igniter guaranteed for two years. Burns cheap No. 3 furnace oil and is Listed by the Underwriters' Laboratories.

#### OTHER H. C. LITTLE UNITS for SMALL HOMES



#### RECENT H. C. LITTLE INSTALLATIONS

Wills Project, Dundalk, Md. 112 Units  
U. S. Govt., Indian Head, Md. 65 Units  
Siems Drake Puget Sound Co. 109 Units  
U. S. Navy Cont. 20 Units  
Fairchild Addition, Seattle 22 Units  
U. S. Engineers, Seattle, Wn. 10 Units  
Towers Bldg. Co.,  
Sparrows Pt., Md. 52 Units  
Kelly & Sadtler, Dundalk, Md. 102 Units

### H. C. LITTLE Burner Co.

San Rafael, Calif.  
Warehouse Stocks and  
Direct Factory Representatives in Boston,  
Newark, Baltimore, St.  
Petersburg, Aurora, Ill.,  
Seattle and Portland,  
Oregon.

Please send me FREE BOOK-  
LET, "Six Low-Cost Oil Fur-  
naces for Defense Homes".

Name.....

Address.....

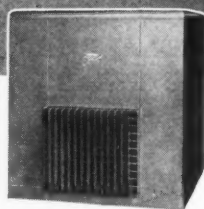
City.....State.....



# EVAPORATIVE COOLING . . . . *Your Best Bet*



(Above) Typical Kooler-aire installation at Marzano Bowling Alleys in Chicago.  
(Right) Front view of Kooler-aire Unit.



## Kooler-aire EVAPORATIVE COOLING Helps You Carry On

**I**F YOU are wondering how to "carry on" under today's difficult conditions, you will find encouragement and opportunity in usAIRco's story—"Today's Job In Evaporative Cooling".

It shows you how you can carry on in the interest of public health and safety with Kooler-aire Evaporative Cooling and Ventilating Units—emphasizes the vital role of air conditioning in the national war effort—how it safeguards health, steps up efficiency, speeds output.

Kooler-aire Evaporative Cooling Units require practically none of the critical materials necessary in refrigeration cooling (which we also manufacture) and take much less productive time to build. They fit into the national economy because they cost much less to buy, install, maintain and operate.

In every kind of store, in restaurants, beauty parlors, bowling alleys, banks—in every place of business—wherever people work or congregate—there's a need for Kooler-aire. We are ready to help you supply this need like we have been helping hundreds of other usAIRco dealers the past 18 years.

**Write usAIRco Today . .  
Ask for "Today's Job"**



**UNITED STATES AIR  
CONDITIONING CORPORATION**  
NORTHWESTERN TERMINAL • MINNEAPOLIS, MINN

be able to direct you to the places where the jobs may be found.

At this writing, however, the Army idea about all this does not quite tally. As you know, the entire Army structure has been revamped. It now consists of three general sections: ground forces, air forces, supply section. Maj.-Gen. Brehon Somervell is the head of the Supply Section. He definitely has been placed over all procurement functions of all the Army, except the Air Forces. That means the Air Forces buy and order all their own supplies, while the section headed by Gen. Somervell purchases, or directs the purchasing of Ordnance Department, Quartermaster Corps, Signal Corps, Corps of Engineers, Medical Department and Chemical Warfare Service:

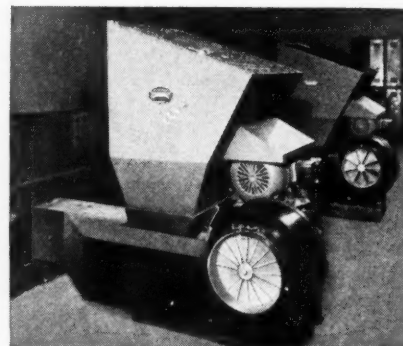
Air Forces have offices in New York City, Detroit and Santa Monica, Calif., but do most of their purchasing and ordering at Wright Field, Dayton, Ohio. Each of the other branches have procurement offices at Chicago, New York and San Francisco, as well as in a number of other cities.

### Woodruff New Chief Over Conversion

The WPB has a new Chief of Conversion. His name is C. A. Woodruff, and he has an office at 462 Indiana Ave., in Washington, D. C. He is expected to bring about the conversion. He says that approximately 85 per cent of the smaller prime orders to be had by smaller business units will come from the Ordnance Department of the Army. Mr. Woodruff is a realist. He says it does not hurt to have your name listed by WPB Contract Distribution Bureau, Ordnance Department, Air Forces, etc.; but if you really expect to get some business, simply wade into the offices—

### HIGH RATIO OF POUND WEIGHT / H. P. DEVELOPED for Long Life with Minimum Service Attention and Minimum Maintenance Cost!

Heavy, rugged construction of FREDERICK underfeed screw type stokers is designed specifically for the rigors of continuous, hard service in industrial uses. Time-out for repairs, maintenance manpower consequently is very infrequently needed.



Equipment includes: Large, heavy duty, three speed automotive type transmissions; oversized motors and fans; burning ends made up of segmental type, interlocking tuyeres. Materials are finest procurable. (COMPLETE DESCRIPTION UPON REQUEST.)

**Hopper and Bin  
Feed Models . . . .  
200 to 850 Lbs./Hr.**

Available with either clinker type burners, or with side dumping grates.

The mechanical simplicity of their construction assures long, "bug-free" operation. Ask about them. No obligation whatsoever.

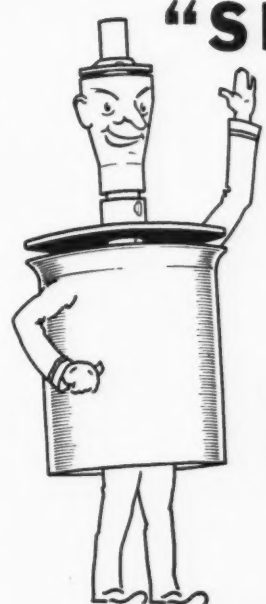
**Frederick  
INDUSTRIAL  
STOKERS**  
**THE FREDERICK IRON & STEEL CO.**  
East St., FREDERICK, MARYLAND  
"Builders of 'Good Stokers for Over 24 Years'"

all of them, often and persistently. The Woodruff theory is that shoe leather, or whatever we use as its substitute, and leg power, will get the business, plus just ordinary common sense and friendliness.

Woodruff, as mentioned, is a realist. He says the shops which employ *certified* welders will get Air Force jobs, and will stand the best all around opportunity to get any jobs. But Mr. Woodruff does not wish to raise hopes too high about immediate jobs for the smaller units. He says, in brutal candor, at this stage, they will be obliged to take the crumbs that fall from the tables of the shops that are better equipped. Contrary to our optimistic Army friends he says there are very few \$25,000 orders or orders anywhere near that low. Woodruff quite obviously represents the Nelson theory that war is too dangerously close upon us, and the prospects of life are too hazardous, to worry much about the little fellow who must confine his efforts to smaller jobs. Woodruff and Nelson seem to think, at least at this hectic stage of the game, the little fellow must worry about himself and find the answer to his own particular troubles.

The chief immediate problem of WPB is to find plants with the facilities to do war work and to break the bottlenecks that are presently clogging production flow. As the going gradually becomes smoother, and war work runs swifter, there is a plan, yet undefined, to force Big and Little Business, with abundant backlogs, to give up whatever civilian production they are still doing, and to turn this civilian production over to the small business units that have not been able to swing onto war production.

WPB, Army and Navy, and Lend-Lease procurement officers, contributed to the following list of suggestions to offer sheet metal fabricators some hints about the



# "SPECIFY John Zink FLOOR FURNACES for Defense Housing"

## WHY?

1. Five sizes from which to choose.
2. Immediate shipment.
3. Easy to install and operate.
4. Fewer service calls—Install them and forget them.
5. Durable—Made of 18 and 22 gauge steel.
6. Guaranteed and approved.

*Write for Information*

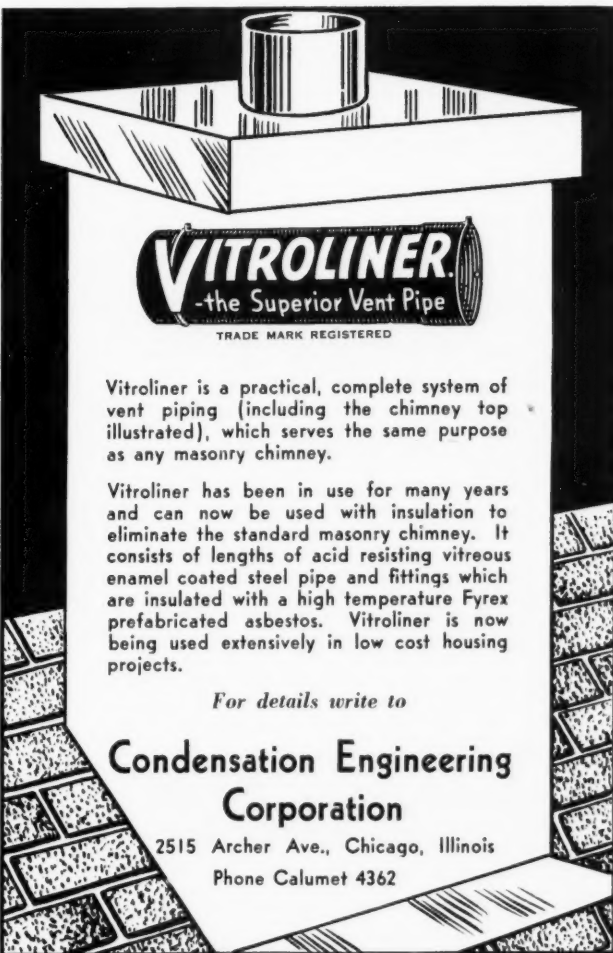
## John Zink Company

TULSA, OKLA.—4401 S. PEORIA AVE.

Chicago, Ill.—7309 E. End

New York City—342 Madison Ave.

Houston, Texas—1401 Waugh Drive



**VITROLINER**  
-the Superior Vent Pipe  
TRADE MARK REGISTERED

Vitroliner is a practical, complete system of vent piping (including the chimney top illustrated), which serves the same purpose as any masonry chimney.

Vitroliner has been in use for many years and can now be used with insulation to eliminate the standard masonry chimney. It consists of lengths of acid resisting vitreous enamel coated steel pipe and fittings which are insulated with a high temperature Fyrex prefabricated asbestos. Vitroliner is now being used extensively in low cost housing projects.

*For details write to*

**Condensation Engineering Corporation**  
2515 Archer Ave., Chicago, Illinois  
Phone Calumet 4362

**STAINLESS  
STEEL**

*Perforated to  
Your Requirements*

SEND US YOUR DRAWINGS  
FOR PRICE

**PERFORATED  
METALS**

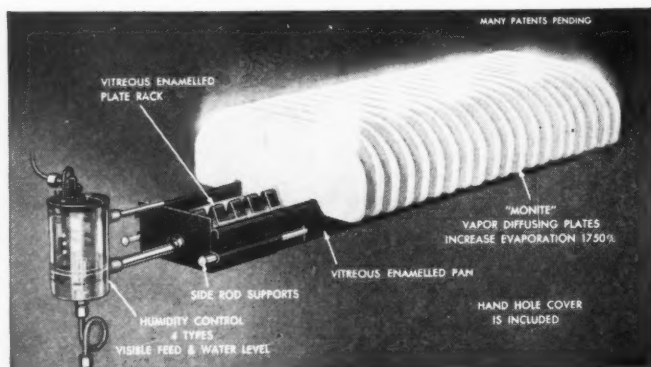
For all Industrial Uses

•

ALL SIZE AND SHAPE HOLES  
ALL METALS

•

**DIAMOND MFG. CO.**  
BOX 29 WYOMING, PA.



**MONMOUTH** gives "honest  
to goodness" humidification!

- Best Engineered • Highest Capacity
- Largest range of sizes • Accurate capacity ratings
- Most Attractive and Modern
- Most Dependable and Durable
- Visible Feed • Visible Water Level

FREE! Get our Humidification Calculator & Literature. Also ask for folio  
"Adapting Your Business for War Times."

**MONMOUTH PRODUCTS COMPANY**  
1933 E. 61st ST., CLEVELAND, OHIO

**MONMOUTH**  
*The Greatest Name in Humidification*

kind of work they may be able to do for war production. Similar work has been done in the past by members of the industry. There still is a censorship prohibition against publication of actual supplies currently required. The suggestions on the following list consist of things that have been made in the past. Incidentally, the Lend-Lease people buy considerable volume of products for shipment to various parts of the world. Lend-Lease Procurement is directed by Robert Le Fevre, Assistant Director, Division of Procurement, Treasury Department, Washington, D. C.

The list, by no means complete, enumerates food mixers; heavy gun parts; bomb fin assemblies; anti-aircraft gun parts; tank parts; hurricane lamps; bomb components; magazine holders; engine cowling; airplane fins; rudders; boilers; bombs; ammunition boxes; fuel tanks; general sheet metal work on small compressors, fuse cylinders, mine sinkers, engine castings, magneto parts, searchlight parts, motor parts, smoke shells; rifle and pistol parts; gun mounts; projectiles; ammunition; cartridge cases; fuse and primer components; airplane radiators; ammunition boxes; shell casings; smoke floats; shell turnings; land mines; trench mortar bombs; shell boosters; steel drums; field cookers; flare parts; depth charge cases; pontoon bridging equipment; cabinets; oxygen cylinders; motorcycle crankcases; ration boxes; coffee filters; field ranges; airplane shock struts; aircraft detection equipment parts; boilers; galvanized containers; floodlighting equipment parts; steel lockers; sound locator parts; marker beacons; metal sugar-bowls; metal meat platters; dinner plates; galvanized buckets; ten-gallon corrugated galvanized cans; tinned cake pans; frying pans; dishpans; meat cans; six-compartment mess trays; field ovens; tent stoves; ship part

## Premier FURNACE CLEANER

**MAKES A BUSINESS  
OF FUEL-SAVING**



• Get profitable service business and aid National Defense at the same time with a Premier Furnace and Boiler Cleaner. It works quickly, thoroughly—saves fuel, keeps customers satisfied and gets leads on additional service work. Light enough for one man to carry and operate easily, this powerful cleaner is ruggedly built for years of use. Write today for complete information.

### NEW IMPROVED MODELS

Completely Equipped

$\frac{5}{8}$  H. P. .... \$74.50  
1 H. P. .... \$89.50

Complete chimney  
cleaning equip-  
ment only  
\$10.00

**ELECTRIC VACUUM  
CLEANER CO., INC.**

1730 Ivanhoe Rd. • Cleveland, O.



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fabrication; cartridge clips; blades, screws, keys; amphibian tanks; bogie wheels for tanks; anti-aircraft shells; powder cans; lighting reflectors; base plates and shell castings; cartridge box liners; fuse plugs; various types projectiles; cartridge holders; parachute flares; many camouflage part details; portable airplane runways; TP boat parts; metal bunks; metal mess-kits; many kinds of metal accessories for the Medical Department.

Army people here suggest the Quartermaster Corps normally buys 175,000 items required for the general housekeeping of the Army. These items include numerous gadgets and devices made of metal that are now difficult to procure from the usual sources. Many of these items would apparently easily fall within the capability of metal working shops. Investigation of the schedule is suggested. The information should be available at any Quartermaster Corps Procurement Office. The office nearest you may be located by making inquiry of any Army headquarters in your immediate vicinity. If you have difficulty, write Col. A. Robert Ginsburgh, Bureau of Public Relations, Industrial Relations Branch, War Department, Washington, D. C., and ask for a copy of *Army Purchase Information Bulletin*; also ask for any special and specific information you may require.

Penn Electric Switch Co., Goshen, Indiana, announces the appointment of Howard C. Shilling as manager of the company's Moline, Illinois, branch office to replace J. G. Moravec, who has been called to active service. Until his appointment, Mr. Shilling has represented Penn in the Chicago territory.

Mr. Moravec, manager of the Moline branch since 1937, has been given a leave of absence by Penn Electric Switch Co., and is now a First Lieutenant with the Army Corps of Engineers.

## A *New* MATERIAL TO TAKE THE PLACE OF SHEET COPPER AND GALVANIZED IRON.

Cheney Pitch-On-Metal is the name of this new protected sheet metal that government departments in Washington are now specifying "for thru-wall flashing, ventilating ducts and all exterior sheet metal work".

Cheney Pitch-On-Metal is made in 26, 24 and heavier gauges. Call on your sheet metal distributor or write us direct for full information.

**THE CHENEY CO.** ARDMORE, PENNA.

## HERE'S THE TAIL That wags the DOG!

BALANCED AT  
FACTORY

MADE OF HEAVY  
MATERIAL

DOESN'T CLOG  
OR WARP

ROCKER TYPE  
FULCRUM

QUICKLY  
RESPONSIVE

FREE SMOKE  
PASSAGE

TYPE M

### IT HELPS YOU SELL THE WHOLE INSTALLATION

Because it is a concrete promise of greater fuel economy, this field Barometric Draft Control is an added incentive to homeowners to buy YOUR line.

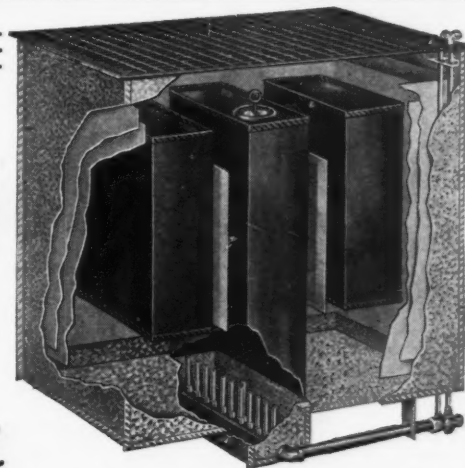
Saves up to 20% in coal or oil installations. Write for complete details on this more accurate, more profitable draft control line.

**FIELD CONTROL DIVISION**  
**MENDOTA, ILLINOIS**



GIVE  
YOUR  
CUSTOMERS  
PROVEN  
QUALITY

## Install COLE'S FLOOR GAS FIRED FURNACES



Here is the floor furnace that burns natural, artificial or mixed Propane or Butane gases with greatest economy and efficiency . . . Cole's Gas Fired Floor Furnaces are equipped with the patented burner whose automatic air intake requires no air adjustments.

The inner heating unit of the Cole Floor Furnace is of full vitreous porcelain enamel. Three walled galvanized steel casing.

Large heating surface and long delayed flue travel get maximum efficiency from fuel. Unit crimped and sealed by special Cole process insuring gas-tight and stay-tight construction.

Combination safety pilot and automatic thermostatic heat control available for all Cole Floor Furnaces.

Write for full details today.

**COLE HOT BLAST MFG. CO.**

3108 West 51st St.

Chicago, Ill.

## Bits and Pieces

(Continued from Page 31)

we have tried to get a copy of this new code from FHA and FWA and we have not been able to get it. We have been told that a new code is under study; in fact, has been written and revised many times but we have not been able to get the code.

Our idea, then, is to be forewarned of what MAY come and be ready for the worst.

### U. S. WAR FINANCING

Not that it means much to the layman — we've certainly gotten used to mouthing figures far beyond our comprehension—but the Treasury's latest report shows that authorized expenditures for war, including foreign orders, from the beginning of the defense effort through February 15, plus requests for war purposes now before Congress, total an estimated 145 billion, 400 million dollars.

The money will go for munitions, implements of war, equipment for Army-Navy like ordnance, planes, ships, construction of industrial facilities, emergency housing, posts, depots, pay and subsistence of the armed forces, civilian defense, administrative expenses.

Where, we should like to know, have gone those prophets who a few short months ago were academically debating whether the United States could stand a 100 billion dollar debt? But the real point, of course, is some how, some time this debt must be paid—by individuals and businesses—so the future outlook for less taxes is poor, indeed.

### GOD! THINK OF THE BOOKKEEPING

War Production Board reports that the Production Requirements Plan has already demonstrated its flexibility and usefulness—in proof—there are now more than 4,000 applicants and more than 2,500 companies operating under the plan on February 24.

Under PRP firms avoid the

necessity of applying for or extending a large number of separate preference ratings by making a single application covering needs for a calendar quarter. About 20 per cent of the applicants under PRP do an annual volume under \$100,000 (PD-25X). Applications are now being received at the rate of more than 400 a week.

Up to February 19, 3,717 applications had been received; 2,555 had been approved; 303 had been denied; the rest were pending decision. The average application is processed in from 10 to 12 days.

No one industry, of course, uses all the priorities orders in the M, P, E, L series and the related PD forms. Perhaps of interest, the latest WPB information booklet lists 82 current P orders; 86 M orders; 25 L orders; 3 E orders. If we assume that all these orders require the 3, 4, 5 or more sets of applications and the extensions thereto it quickly becomes apparent that the volume of paper work required about equals in poundage the volume of metals applied for.

What a bookkeeping riot.

## Let ALLENS Clear the Atmosphere!



The complete, widely varied line of automatic and power-driven ALLEN VENTILATORS supplies the sheet metal man with the "answer" to every ventilation job, on all sizes and types of buildings. Because of the extremely high quality and perfection of engineering design, found in every Allen type, you assure satisfaction of your customers (and thus continued repeat business) by always installing ALLENS.

We do not compete with the sheet metal contractor in any way, but cooperate with you closely. You supply stacks and ducts, in addition to installing the ventilators. Our engineering service is at your disposal, free of charge.

Write today for complete information for your files.

**The ALLEN Corporation**  
9752 ERWIN AVE. DETROIT, MICHIGAN

## THERMO-DRIP HUMIDIFIERS



These floatless, drip-feed humidifiers prevent water from coming in contact with two or more metals simultaneously. That explains why THERMO-DRIP installations are singularly free from electrolysis!

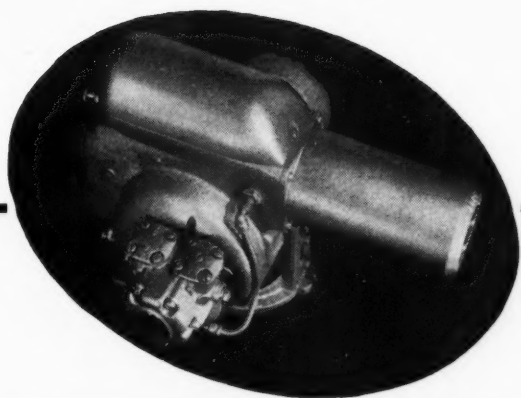
**AUTOMATIC HUMIDIFIER CO.**  
18th and Main Streets CEDAR FALLS, IOWA

## CHICAGO STEEL BRAKE



BEST BY FORTY-TWO YEARS TEST

**DREIS & KRUMP MFG. CO.**  
7404 LOOMIS BLVD. CHICAGO



### With HERCO Your Profit Stays Put!

WITH Herco, a profit earned is a profit kept. Fine parts *plus* Herco Unit Engineering *plus* exclusive Herco features provide smooth performance that cuts servicing to the vanishing point.

The Herco Thrifti-Fier (standard on all models) offers the timely advantage of maximum fuel economy. The light-actuated Mercoid Visaflame (on the Herco Residential) assures proper operation of the burner independent of varying stack temperatures.

Investigate Herco's protected profit and easy-to-sell features.

HERCO OIL BURNER CORPORATION - LANCASTER, PENNA

**HERCO**  
*The Oil-Thrifty*  
**OIL BURNER**

All Herco Oil Burners are listed as approved by Underwriters' Laboratories, Inc., for Commercial Standard CS75-39.

## ★ STEP UP PRODUCTION! MARSHALLTOWN THROATLESS SHEARS

THE *most*  
PROFITABLE  
TOOL IN  
THE SHOP

Cut ANY shape—ANY size  
sheet!



No. 18  
Hand  
Power!

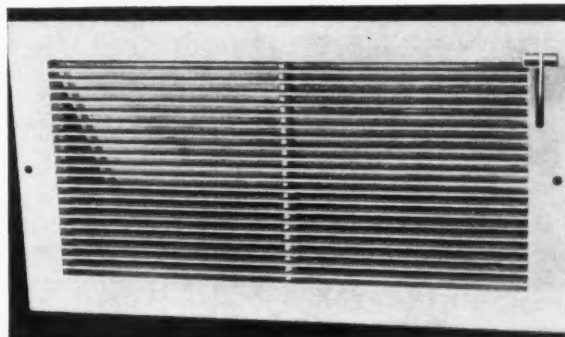
Here's just the Shear for your shop—it's a PROFITABLE, inexpensive, hand-operated tool. Does hundreds of odd shearing jobs better and faster.

Quickly CUTS ANY SHAPE in 18 gauge or lighter material.

Get special Shear Bulletin today. Gives details of sizes from 18 gauge to one-half inch capacity.

**MARSHALLTOWN MFG. COMPANY**  
920 E. Nevada Street      Marshalltown, Iowa

## GRILLES and REGISTERS



Fabricated or Stamped

*You Can Get It  
Quicker from Stewart*

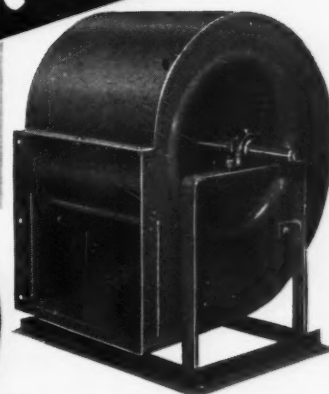
Production facilities for volume orders.

Quick shipment of special sizes.

**Stewart Manufacturing Co.**  
309 Washington Street      Orange, N. J.



**QUIET  
RUNNING**



**Complete Range of Sizes**

Both wheels and complete assemblies are built in sizes to meet any capacity, pressure and speed requirements.

*Perfectly  
Balanced Wheels and  
Better Bearings Do It!*

Use Clorage Fans in your conditioning units and in forced air heating — and you've licked the problem of noise. QUIET RUNNING — the result of mechanical superiority — that's why Clorage Fans are so universally preferred.

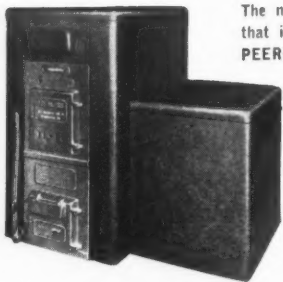
**CLORAGE FAN COMPANY—KALAMAZOO, MICH.**  
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES



COMPLETE  
AIR CONDITIONING  
• COOLING  
• VENTILATION  
• FACTORY HEATING  
• MECHANICAL DRAFT  
• FANS and BLOWERS  
FOR INDUSTRIAL NEEDS



## PEERLESS FURNACES MEET ALL COMPETITION



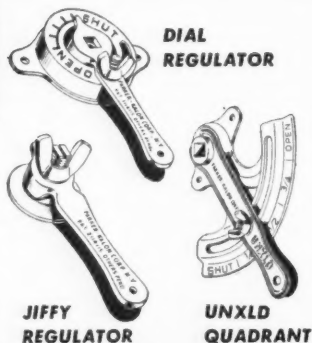
The name **PEERLESS** on any furnace insures that it was made by a reliable manufacturer. **PEERLESS FOUNDRY COMPANY** has been a pioneer in warm air heating for over a third of a century. Write for dealer proposition.

**REPAIR PARTS**—**PEERLESS** manufactures and maintains a complete stock of repair parts for all makes of furnaces. Write for parts catalog.

**PEERLESS FOUNDRY CO., 1853 Ludlow Ave., Indianapolis, Ind.**

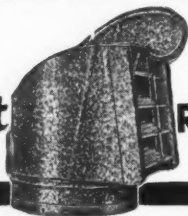
## A Type And Size For Every Need

For efficiently controlling light and medium dampers in heating, ventilating and air conditioning systems, specify **Parker-Kalon Damper Controls**. The line includes all types and sizes, at a range of prices to fit the needs of any job. **Parker-Kalon Corp., 190-192 Varick Street, New York.**



## PARKER-KALON damper controls

## Swartwout ROTARY



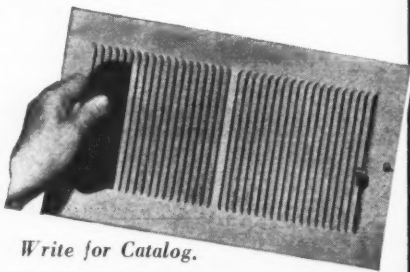
Solve ventilating problems with this high efficiency ball bearing Rotary—well known to industry for 36 years. Superior construction features, stream-lined design. Thousands in use on all types of buildings.

**THE SWARTWOUT CO. 18511 Euclid Ave. Cleveland, Ohio**

## Swartwout

## STANDARD "BEND-EZY" REGISTERS INSURE SATISFACTION!

Everything you want in Registers! Easy installation, adjustable airflow, efficiency and durability. Reasonably priced ... ideal for low cost defense housing. Use "Bend-Ezy" Grilles for modern design.



Write for Catalog.

**STANDARD**

3137 W. 49th PLACE

**STAMPING &  
PERFORATING CO.**  
CHICAGO, ILLINOIS

## With the Manufacturers . . .

### International Nickel Detroit Office

The International Nickel Company, Inc., announces the moving, as of January 1, 1942, of the Detroit office of its Development and Research Division from the tenth floor, Room 10-227, to the eighth floor, Room 8-217, of the General Motors Building in Detroit, due to increased defense activities. The telephone number remains the same.

### Personnel Appointments

**Research Products Corporation**, Madison, Wisconsin, has recently appointed three new representatives for the distribution of Research Air Filters.

**Wm. G. Boales & Associates**, 6429 Hamilton Avenue, Detroit, is the representative for the state of Michigan.

**W. F. Dollinger, Jr.**, 549 W. Washington Blvd., Chicago, is representative for Chicago and the northern part of Indiana.

**H. A. Beaman**, 1032 Congress Avenue, Indianapolis, Indiana, is representative for the southern part of Indiana.

**Grant Wilson, Incorporated**, insulation and fireproof materials, 4101 West Taylor Street, Chicago, announces the following changes in corporation officers, effective January 1:

**Edward A. Wilson, Jr.**, who is in charge of sales in the Detroit area, was elected Secretary.

**Theodore O. Dallman**, who has been Manager of Operations, was elected to Vice-Presidency.

**Myron W. Mitchell**, who has been Manager of Accounts, was elected to the office of Assistant Treasurer.

The other officers and directors were re-elected.

The Rybolt Heater Company, Ashland, Ohio, announces that **Harold J. Milks**, Production Manager, has also been appointed in charge of the Engineering Department. Mr. Milks, who has been with the company three and one-half years, is a graduate of Michigan State University. He is twenty-nine years old and married.



**H. J. Milks**

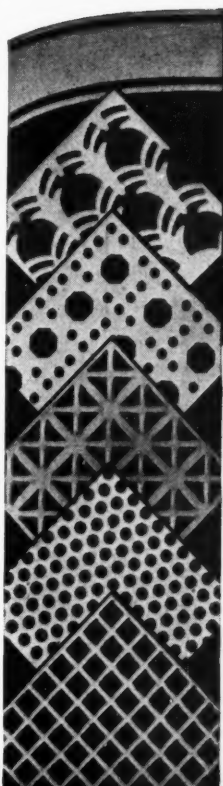
**General Controls Co.**, Glendale, Calif., announces the appointment of **L. E. (Rusty) Wetzell** as manager of the company's Cleveland branch office in complete charge of sales and service in Ohio, West Virginia and portions of Pennsylvania, Kentucky and Western New York. Office, 1505 Broadway, Cleveland.

**J. D. McKnight** has been named Assistant District Manager of Allegheny Ludlum Steel Corporation's Detroit office.

The appointment follows six years of sales experience for Mr. McKnight with Allegheny Ludlum, starting in 1936 when he joined the Detroit staff of the former Allegheny Steel Company. In his present position, Mr. McKnight will assist **H. N. Arbuthnot**, manager of Allegheny Ludlum's Detroit office.

**Norge Heating and Conditioning Division of Borg-Warner Corporation**, Detroit, announces the appointment of **Wm. L. Diener, Inc.**, Advertising Agency, Chicago, to handle its advertising and publicity. Plans are already under way for an intensive promotion of Norge Oil Heating Units for Defense Housing Projects.

The Norge line embraces a complete range of compact, automatic, factory-wired units adaptable to any size or type of defense home. All units are approved by government specifications.



**INDUSTRIAL  
PERFORATED  
METALS  
ORNAMENTAL**

The H. & K. line offers a wide selection of ornamental and decorative grilles for public and private buildings suitable for radiator enclosures, ventilators and air conditioners. Write for Booklet No. 30.--Industrial screens for grading and separating many products -- for safety guarding and other uses. Unusual specifications carefully executed.

•

**ANY METAL  
ANY PERFORATION**

**The Harrington & King  
PERFORATING CO.**

5649 Filmore St., Chicago, Ill. New York Office, 114 Liberty St.



**THE HOME FRONT IS  
IMPORTANT, TOO!**

• Defense Installations of P. G. R. Heating Equipment.

From coast to coast—in camps, cantonments, barracks, training stations and defense homes—PACIFIC gas heating equipment does its bit in maintaining the high standard of health and comfort our service men deserve.

More than 29 years of specialized engineering experience in gas heating problems, plus one of the Nation's largest plants devoted exclusively to the manufacture of gas heating equipment—these are contributions for the "duration."

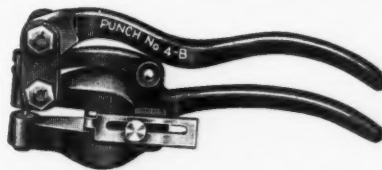
Whenever there is a need for health-building warmth and comfort—in camps or training stations, in factories, in defense homes—PACIFIC heating equipment is in the front line of service.

**Pacific**  
GAS RADIATOR CO.  
HUNTINGTON PARK, CALIFORNIA



59

A REAL *Time Saver*



*The No. 4B PUNCH  
by Whitney*

This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of 1/4" through 16 ga., weight 3 pounds, 8 1/2" in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key.

**W.A. W  
WHITNEY MFG. CO.**  
636 RACE ST. ROCKFORD, ILL.

**NEW  
AIR CONDITIONING  
REGISTERS**

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



**No. 822 Wall Register — Horizontal Vanes**

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment. Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.  
Rock Island, Ill.

Gentlemen:

Please mail me a copy of your dealer's net estimating book.

Name .....

Street Address .....

City and State .....





**REGISTERS • GRILLES  
AIR CONTROL DEVICES  
LOUVRES • VANES • SHUTTERS  
DIFFUSERS • DAMPERS  
DOOR VENTILATORS**

**WATERLOO REGISTER COMPANY**  
WATERLOO, IOWA • SEATTLE, WASH.  
*Representatives in principal cities*

**NOW! ACCURATE AIR VELOCITY MEASUREMENTS at INTAKE GRILLES!**



This new jet attachment can be added to existing Tube-type Velometers now in use, or can be purchased with other standard jets and new Velometers. The new intake grille jet is offered only in the spot type since the center reading only has proven to be sufficiently accurate for all commercial purposes. Write for information.

**Illinois Testing Laboratories Inc.**  
412 N. La Salle St., Chicago, Ill.

**JOHNSON**  
Furnace No. 118  
*Quicker Heat at Less Cost*

Heats the largest soldering coppers, brand and stenciling irons. Can be used for tempering, heat-treating, annealing, case-hardening or melting soft metal. Firebox 8 1/4" x 5" x 6 1/2", heavy refractory lined. Removable lid permits using 22 lb. capacity melting pot.



Write for Prices and New Catalog.

**JOHNSON GAS APPLIANCE CO.** 564 E. AVE. N.W. Cedar Rapids, IOWA. OUR 41st YEAR

**PRIORITIES Don't Kill Profits on Service Calls**

If you can't get new plants—materials—sell Super cleanings and make good money anyway! Home owners want cleanings when you show how they save fuel—save furnaces, cleanings uncover needed repairs and replacements. Try a Super Red Streak Furnace Cleaner for 5 days—free. Make it PROVE itself.



**THE NATIONAL SUPER SERVICE COMPANY**  
1944 No. 13th St. Toledo, Ohio

## Reducing Room Temperature at Night

(Continued from page 52)

plants, apart from any question of fuel saving, the limited fuel capacity of the firepot usually makes it advisable to bank the fire at night, and to maintain a reduced rate of combustion in the furnace, in order to prevent all of the fuel from burning out before morning. For gas-fired and oil-fired furnaces in which a fixed rate of heat input is maintained, it is probable that the losses occurring during the warming-up period are not materially larger than those occurring during normal periods of intermittent operation.

The curves shown in Fig. 22 indicate that the time required for warming the Residence was a function of the outdoor temperature and of the rate of fuel input to the furnace. A high rate of fuel input would decrease the time required for

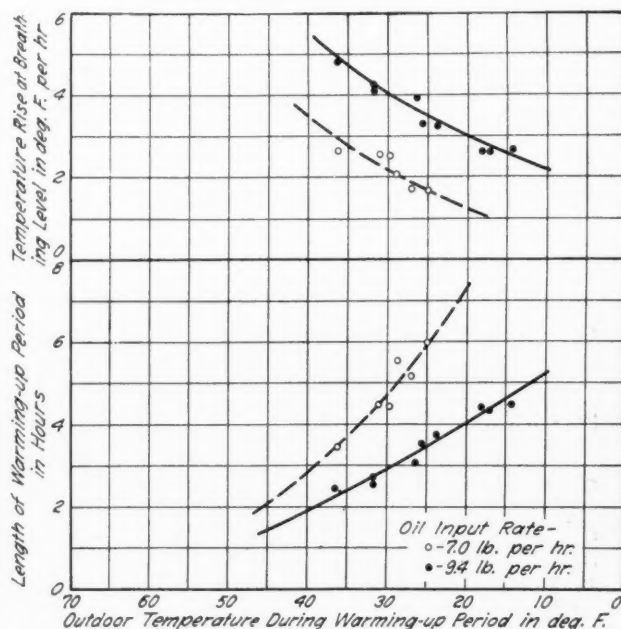


Fig. 22—Rate of warming-up of Research Residence.

warming the house and might allow the start of the warming-up period in the morning to be delayed until some time later than that necessary when a low rate of fuel input was used. The slightly longer period of reduced house temperatures resulting from the operation with the high rate of fuel input would tend to increase the fuel saving effected by the reduction of house temperatures at night. On the other hand, during normal intermittent operation, a lower rate of fuel input into the furnace is accompanied by slightly better efficiency than is a high rate of fuel input. For most economical operation, therefore, a compromise must be made between the use of a net fuel rate just sufficient to take care of the maximum design load, and the use of a gross fuel rate that

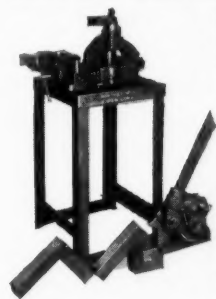


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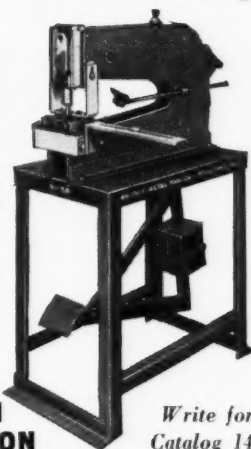
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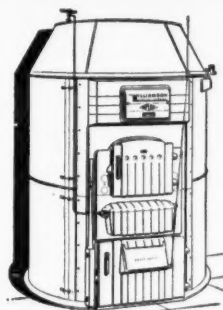


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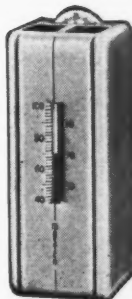
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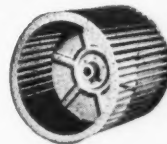
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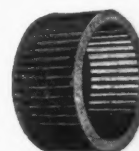


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will provide for a reasonably short warming-up period.

#### Conclusions

The following conclusions may be drawn as applying to the Research Residence and the conditions under which the tests were conducted:

(1) By setting the room thermostat at 60 deg. F. for the period between 10:00 p. m. and 4:30 a. m., instead of maintaining a constant room temperature of 72 deg. F., a fuel saving of from 7 to 11 per cent was effected in an oil-burning furnace plant.

(2) The actual fuel saving was in good agreement with the fuel saving of 9.4 per cent as determined by calculation.

(3) The application of the equations for calculating the fuel savings is limited to cases in which the rate of warming the structure is approximately the same as the rate of cooling, and in which the efficiency during the warming period is practically the same as that for periods of normal operation.

Hubert Kaub, 1029 Santa Fe Drive, Denver, Colorado has been appointed as a representative to cover Colorado, Wyoming and New Mexico for Research Air Filters, according to an announcement by Research Products Corporation of Madison, Wisconsin.



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(Continued from page 47)

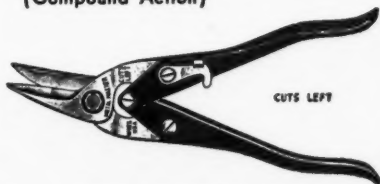
All warm air registers are located just above door tops so that no fittings are needed. To obtain control over air dispersion, two-way deflecting registers were used and were set to get air distribution throughout each room.

Cold air grilles—four all together—open directly off the floor into the fan housing and require no fittings. There are two returns from the living room, one from the bedroom hall, and one from kitchen—each 14 by 6 inches. One photograph shows the two living room returns with the register in the stud space between and at door height.

### Low Cost

These upright furnace systems, as shown on Plan number 2, including the register and balancing damper, all duct work, necessary cutting (framing made by carpenters, of course), showed a material, fabrication and erection cost of just about \$100 exclusive of furnace. This low cost was made possible by the obvious corner cutting described—very short runs of duct, almost no fittings, returns on inside walls, plain straight-up plenum, no stacks—but the results are superior to the slightly cheaper floor furnace system of Plan number 1.

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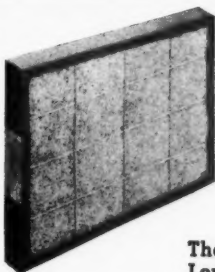
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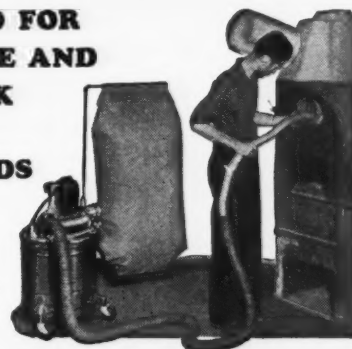
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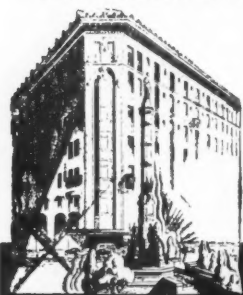
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## Automatic Controls

(Continued from page 49)

thermostat with system No. 2 in order to maintain a more or less uniform gravity heating effect during the off-periods of the blower. Let me explain this in more detail.

Suppose, for example, the bonnet switch setting is raised to 200 deg. F. which is beyond a normal practical value. In mild weather the blower may operate only a very small portion of the day, the bonnet temperature will be high, and the plant will function primarily as a gravity plant. In severe weather the plant will tend to operate more as a regular forced air plant. The duct system, which is in proper balance in mild weather will not be in proper balance in severe weather. In a separate article this subject of dampering will be taken up in more detail.

QUESTION 68.—What limitations are imposed which prevent one from using a bonnet thermostat setting as low as 100 deg. F. for example when the design value was higher?

ANSWER 68.—There are two limitations. First of all, extremely low bonnet air temperatures may result in extremely low temperatures of the air entering the rooms. It is possible to use lower settings of the bonnet thermostat when the warm air registers are located at the high sidewall than when they are located at the baseboard.

In the second place, if the setting of the bonnet thermostat is too low, the *average* bonnet temperature may also be so low that the house will fail to heat in extremely cold weather. In a case of this sort, all that is necessary is to raise the setting of the bonnet thermostat.

QUESTION 69.—What about the matter of *range* of bonnet air temperatures as affecting the operation of the heating plant?

ANSWER 69.—You may recall that with system No. 1, when the *range* of bonnet air temperatures was narrowed from say 40 deg. to 20 deg. F., the blower operated more frequently and the room temperatures did not over run as much.

With system No. 2, whatever we do to the bonnet thermostat setting will not affect the "precision" control of the room temperatures, since that is governed solely by the room thermostat.

However, if the setting of the high limit switch controlling the burner is adjusted from 175 to 165 deg. F. and if the setting of the low limit switch controlling the burner is raised from say 135 to 145 deg. F., then the normal operation range of the blower will be reduced.

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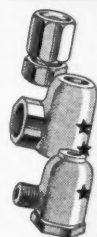
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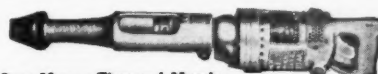
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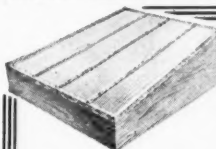
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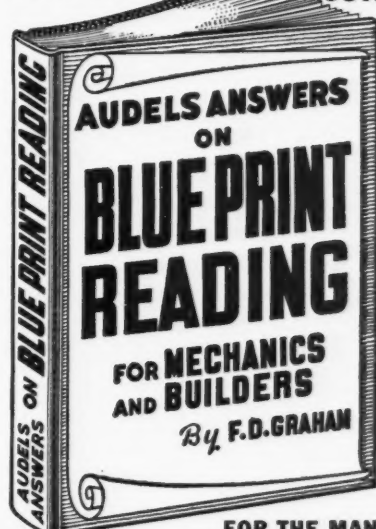
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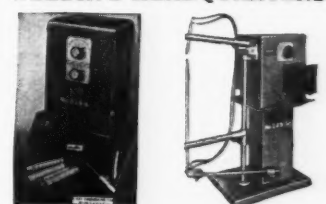
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TO WHOLE NATION

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"REMEMBER PEARL  
HARBOR" NATION'S  
BATTLE CRY



*You've got a job  
to do for Uncle Sam..*

get those war plants  
under cover fast..with

# MILCOR

## Steel Roof Deck



• Above: Milcor Steel Roof Deck being applied on new plant of A. O. Smith Corp., Milwaukee, Wis. Midwest Ventilating Co., Contractors.

• Below: 1140 squares of Milcor Roof Deck were required to cover the huge Smith plant constructed as part of the national armament program.



**Quickly attached — clipped or welded — to any structural member, on small or large construction . . . You can get any quantity for war production from Milcor — in record time**

Milcor Steel Roof Deck offers advantages you can't afford to overlook now when new industrial plants must get into production quickly:

**SPEED** — Milcor Roof Deck can be erected anytime — no waiting for the weather. Unique design enables you to nest sections with amazing speed.

**LOW COST** — Milcor Roof Deck eliminates the expense of heavy super-structures . . . provides long-run economy.

**FIRE SAFETY** — Regardless of whether fire is of interior or exterior origin, Milcor Steel Roof Deck is an effective fire barrier.

**INSULATION** — Milcor Roof Deck is adaptable to any standard type of insulation. Smooth deck permits easy application.

Free, colorful catalog gives facts about Milcor Steel Roof Deck that you should have now when industrial plants look to you for help in speeding construction

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